

## 8.7 Transportation Operational Policy and Procedures

### 8.7 (28)

#### **Comment** - 20 comments summarized

Commenters said that the EIS should examine the effects on the transportation of spent nuclear fuel and high-level radioactive waste from earthquakes, faulting, floods, range fires, areas of high winds, tornadoes, lightning strikes, and severe weather. Commenters wanted to know what is being done to protect trains and trucks during these events, and suggested that road safety and train-track safety be tested. Some wanted to know if spent nuclear fuel and high-level radioactive waste would be transported through northern Nevada during the winter when severe blizzards can strike. Commenters also wanted to know whether safe havens or alternative routes could be designated on short notice based on real-time data sources, and who would decide when a shipment should be halted. The responsibility for checking and interpreting road conditions, stopping a shipment, or allowing it to proceed was also questioned.

#### **Response**

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. Section M.3 of the EIS provides a discussion of the protocols and procedures that would be implemented by a Regional Servicing Contractor and its subcontractors under adverse weather or road conditions. The procedures are in two parts.

One part of the procedure relates to preshipment planning, which would use available data related to expected conditions. Shipments would not be dispatched on a route where expected conditions would not comply with the requirements in the procedures. Weather forecasts would be obtained by the Regional Servicing Contractor as part of the preshipment planning, and forecasts for rain, snow, fog, high winds, and tornado warnings would be considered in the determination of the shipment schedule. In general, Regional Servicing Contractors would be responsible for the planning, implementation, and control of the shipments, including responding to changing conditions, as necessary. A contractor would acquire information of road or highway construction that could temporarily affect the planned route. Through consultations with the affected states along the planned route, the contractor would obtain road and highway conditions and information on anticipated construction, along with planning information on long-range highway construction.

The other part of the procedure relates to problems along the route and is for those persons actually involved in making the shipment who would be best able to discuss and report expected and encountered conditions. DOE Protocols, which would be implemented by the Regional Servicing Contractors, require that shipments would not travel when severe weather conditions along routes or adverse road conditions would make travel too hazardous to proceed. Driver and crew communications with the control center would provide advanced warning of potential adverse conditions along the route. If unanticipated severe weather or adverse road conditions were encountered, the driver and crew would contact the control center to coordinate routing to a safe parking or stopping area if it became necessary to delay the shipment until conditions improved. Section M.3.2.1.3 of the EIS provides detailed information on the selection of safe parking areas to be used in the event a shipment had to be delayed.

Rail carriers would use train control and monitoring systems to identify the location of their trains within the rail system and to make informed decisions based on this information to avoid or minimize potential weather-related or track Condition risks. Under 49 CFR 174.20, the carrier can impose local restriction on transportation when local conditions make travel hazardous.

The transportation regulations of the Nuclear Regulatory Commission include shipping cask design requirements for normal and accident conditions of transport (10 CFR Part 71). The regulations do not specifically address natural disasters such as earthquakes, floods, or tornadoes. However, if a shipment to Yucca Mountain was involved in any of these natural disasters, the impact on the cask would be within the bounds of the hypothetical accident defined in 10 CFR Part 71. The shipping casks used to transport spent nuclear fuel and high-level radioactive waste would be massive and tough with design features that complied with strict regulatory requirements that would ensure the casks performed their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of*

*Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

#### 8.7 (140)

**Comment** - 5 comments summarized

Commenters stated that truck safety had been left up to private industry and yet, with these standards, accidents still occurred. Commenters expressed concern about the plan and the protocol that would be used to recover a heavy cask that was displaced from the conveyance vehicle. Commenters questioned how a cask would be recovered if there was a train or truck wreck and the cask dropped to the ground, fell down the side of a mountain, a flash flood overturned a shipment, a cask fell into a gorge, or a cask rolled into a river or lake. Commenters asked, if there was a crash from a collision that involved fire, would the cask remain intact and would there be a chance of a serious nuclear release. Other commenters wondered how a massive cask would be lifted and stated that to lift a 91-metric ton (100-ton) or larger cask would require a portable crane that might not be available.

**Response**

DOE agrees that accidents could occur during transportation of spent nuclear fuel and high-level radioactive waste to a repository. However, the shipping casks that would be used to transport these materials would be massive and tough with design features that complied with strict regulatory requirements that ensured the casks performed their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

Recovering 23-metric-ton (25-ton) truck casks or rail casks weighing up to 136 metric tons (150 tons) loaded with spent nuclear fuel or high-level radioactive waste would use methods commonly used to recover heavy trucks or railcars and locomotives following accidents. The capability to lift such weights exists and would be deployed as required. Railroads use emergency response contractors with the capability to lift derailed locomotives that could weigh as much as 150 tons. Difficult recoveries of equipment as heavy as spent nuclear fuel casks have been accomplished in areas such as those identified by the commenters. DOE anticipates that if such a recovery was necessary, it would be accomplished using methods and equipment similar to those used in prior difficult recoveries.

The Operational Protocols that the transportation contractors would have to follow are included in Section M.3 of the EIS. These protocols require the transportation contractors to be responsible for providing DOE with specific written procedures that clearly define detailed actions to be taken in the event of an abnormal event. These procedures would address repair or replacement of equipment, or recovery, as appropriate. These requirements would apply to transport by both truck and rail. Section M.5 addresses emergency response.

#### 8.7 (141)

**Comment** - 31 comments summarized

Commenters asked questions about the potential for individual radiation exposure, including radiation doses to people living along the transportation routes as a result of normal cask radiation emissions. Of concern was monitoring of public and worker exposure and compensation for effects of radiation on public health.

### **Response**

Transportation workers' exposure would be the responsibility of their employers.

Exposure to the public under incident-free conditions is discussed in Sections 6.2.3.1 and J.1.3.2.1 of the EIS. An analysis was done to determine the amount of radiation exposure to the maximally exposed individual, a hypothetical person who would receive the highest dose.

The U.S. Department of Transportation routing requirements, along with regulatory requirements to limit radiation dose external to a shipping cask, help to ensure that radiation dose to persons living along routes would be low. The analysis in Chapter 6 of the EIS for the mostly legal-weight truck scenario estimates the doses to persons who would drive alongside the trucks as they traveled on the highways, who would be stopped in locales where truck shipments stopped, and who lived along the routes that would be used. In response to public comments, DOE forecasted growth in populations along routes to improve its estimates of impacts that could occur during shipments. However, the estimated dose to an individual living along a route would not change with changes in population: only the integrated dose to the whole population would change. The dose for a maximally exposed individual who lived along a route would be an average of about 0.25 millirem per year. This is about 400 times less than the maximum dose permitted for members of the public in 10 CFR Part 20 (100 millirem).

Based on public comments, the Final EIS includes estimated public health impacts along transportation routes. This analysis accounted for factors such as the locations of intersections, commercial establishments and residences, and traffic signals. The impacts of incident-free transportation would be so low for individuals who lived and worked along the routes that these individual impacts would not be discernible even if the doses could be measured. The total impacts of transportation would be similar for different routes that might be used.

Although DOE has characterized the environment along the candidate transportation routes and corridors in Nevada, it has not performed a baseline health assessment. DOE believes it has estimated the potential environmental impacts, including health impacts, in sufficient detail to allow decisionmakers to determine the relative merits of each transportation scenario. However, DOE would assess the environmental and engineering conditions along the selected corridor in the appropriate National Environmental Policy Act document.

The Price-Anderson Act establishes a system of financial protection (compensation for damages, loss, or injury suffered) for the public in a nuclear accident, regardless of who causes the damage. See Section M.8 of the EIS for a discussion of the Price-Anderson Act. Responsibility for cleanup of released materials would be shared between DOE, the owners of the materials, and carriers under regulation of the Motor Carrier Act of 1980.

### **8.7 (142)**

#### **Comment** - 27 comments summarized

A number of commenters expressed concern about the safety of shipments by rail. Commenters expressed concern with both mainline and branch rail line shipments to the repository. Commenters expressed concern with adherence to Federal and state regulations (and allowing Nevada oversight on branch line operations). Other commenters suggested specific operational restrictions to ensure safety. Commenters also expressed concern that privatization of rail operations would jeopardize the relationships and agreements that have been developed between DOE and states, tribes, and other responsible jurisdictions, including planning, operations (when, where, and how), training, technical assistance, and funding. A specific concern was having a low bidder planning and transporting spent nuclear fuel and high-level radioactive waste. Other commenters were concerned with the degraded conditions of railroads, including the inadequacies of rail crossings and increased collisions. Several commenters expressed concern with the rail maintenance programs and the need to switch from reactive maintenance to preventive maintenance programs to improve safety. Several commenters expressed concern with the placement of cars carrying spent nuclear fuel and high-level waste in a train indicating that cars near the front seem to be less affected by rail breaks and displacements than cars near the end of a train. Part of this concern was related to the signal systems on rail lines and data that indicate that rail malfunctions have occurred without a corresponding signal. All in all, the commenters' focus was on a recommendation that trains carrying spent nuclear fuel and high-level radioactive waste need to be operated in a different, more controlled mode than regular freight trains and that ownership and operational management of any new branch rail line should be evaluated against the contribution to risk management and regional economic benefit.

### **Response**

In response to these and other public comments, DOE has added information on proposed transportation activities to the EIS (see Appendix M). Information added includes the regulations that govern spent nuclear fuel and high-level radioactive waste transportation, the proposed process that DOE would use to acquire commercial transportation services, and the expected operational details and protocols DOE would follow if the Yucca Mountain site was approved.

Transportation of hazardous materials in the United States is a very highly regulated activity, and transportation to a repository would be conducted under the umbrella of these regulations with oversight, as applicable, of various local, Native American tribal, state, and Federal agencies. This would ensure that all shipments would be made safely (see Section M.2 of the EIS).

At this time, DOE plans to use private industry, including railroads, to the maximum extent possible, to accomplish its transportation mission. Such an arrangement, however, would not jeopardize the relationships and agreements that have been developed between DOE and its stakeholders. DOE would retain responsibility for policy decisions, stakeholder relations, final route selection, and implementing Section 180(c) of the NWPA. DOE would award contracts for acceptance of spent nuclear fuel and high-level radioactive waste and transportation services to bidders whose proposals DOE considered to be most advantageous to DOE, with cost being only one of a variety of selection factors. One of the qualifications that must be met by a successful bidder would be to have performed a major transportation and logistics coordination project involving railroad, truck, or intermodal carriage of radioactive, toxic, or other types of hazardous materials within the past 10 years. DOE would require the transportation contractor to provide for maximum use of dedicated train service and advanced rail equipment features where this type of service or equipment can be demonstrated to enhance operating efficiency, dependability, and cost-effectiveness or lessen the potential of adverse railroad equipment incidents. See Section M.3.1 of the EIS for more information on the acquisition of contractor services.

Oversight of branch rail line operations in Nevada, if there was a decision to build such a line, would depend on several factors not known at this time. Maintenance of rail lines is prescribed by Federal Railway Administration regulations and the maintenance is checked by the Administration. The U.S. Department of Transportation has issued regulations designating the placement of cars carrying spent nuclear fuel in the makeup of a train (49 CFR 174.85 and 49 CFR 174.700).

### **8.7 (143)**

#### **Comment** - 7 comments summarized

Commenters wanted to know what specific guidelines govern the movement of spent nuclear fuel and high-level radioactive waste. They stated that the designation of the rail routing should be determined in advance, that the U.S. Department of Transportation does not regulate the routing of rail shipments or radioactive materials, and that some entity must assume authority for routing and that designee should be identified in the EIS. Other commenters stated that the shipment of spent nuclear fuel would be regulated by the Nuclear Regulatory Commission and the U.S. Department of Transportation and that routing would be strictly controlled with input from states and Native American tribal groups.

Another commenter stated that the Public Utilities Commission regulates the safe transportation of radioactive and other hazardous materials on the state's highways and railways and that it has adopted the U. S. Department of Transportation safety regulations. A representative from the Public Utilities Commission of Ohio stated that it was the Commission's intention to involve local communities when routes were designated in communities under its jurisdiction. Another commenter stated that the U.S. Department of Transportation and the Nuclear Regulatory Commission, as overseers of spent nuclear fuel and high-level radioactive waste storage and transportation, are both demanding organizations that would not allow activities to occur if they did not meet the prescribed requirements.

### **Response**

In response to public comments, DOE has added to the EIS information on the regulations that govern the transportation of spent nuclear fuel and high-level radioactive waste (see Appendix M). The Nuclear Regulatory Commission and the U.S. Department of Transportation share primary responsibility for establishing and enforcing requirements for the safe transportation of radioactive materials, including spent nuclear fuel and high-level

radioactive waste, and DOE would comply with these regulations when transporting spent nuclear fuel and high-level radioactive waste to the proposed repository.

U.S. Department of Transportation regulations set the standards for packaging, transporting, and handling radioactive materials, including labeling, shipping papers, placarding, loading, and unloading requirements (49 CFR Part 173). These regulations specify training needed for personnel who perform handling and transport of hazardous materials, which includes spent nuclear fuel and high-level radioactive waste.

The NWSA requires that DOE use casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository. The Commission certifies that a cask meets the requirements of 10 CFR Part 71, which prescribes radiological performance standards for casks subjected to specific test conditions. These test conditions represent the kinds of forces that a cask would encounter in a severe transportation accident. In addition, the Commission establishes safeguards and security regulations to minimize the possibility of theft, diversion, or attack on shipments (10 CFR Part 73).

The representative highway routes identified for the EIS analysis conform to U.S. Department of Transportation regulations (49 CFR 397.101). These regulations, developed for transport of Highway Route Controlled Quantities of Radioactive Materials, require such shipments to be on preferred routes selected to reduce the time in transit. A preferred route is an Interstate System highway, bypass, or beltway, or an alternate route designated by a state or tribal routing agency. Alternate routes could be designated by states or tribes under Department of Transportation regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with local jurisdictions and other states and tribes. Federal regulations do not restrict the routing of rail shipments. However, for the analysis, as discussed in Section J.1.1.3 of the EIS, DOE assumed routes for rail shipments that would provide expeditious travel and the minimum number of interchanges between railroads. See Section M.3.2.1.2 for more information on route selection. As required by regulations in 10 CFR Part 73, routes must be submitted in advance to the Nuclear Regulatory Commission for approval.

## **8.7 (144)**

### **Comment** - 15 comments summarized

Commenters stated that the Draft EIS did not address the provision for state notification regarding routes and mode of transportation and that states and tribes needed to be informed if spent nuclear fuel and high-level radioactive waste were to be shipped through their state or community. One commenter stated objection to secret unescorted shipments and stated that local and state authorities had the need to know where spent nuclear fuel would be traveling. Other commenters stated their opposition to shipments pending reliable safeguards being in place to protect their communities. Other commenters expressed concern that notification was necessary so the right people could be available including local response agencies, workers, inspectors, and maintenance workers, and also stated that signage should be posted on the transportation vehicles to clearly notify the public of the hazardous cargo. Other commenters stated that they would expect DOE to voluntarily comply with their state's prenotification requirements to assure the residents of their states that spent nuclear fuel and high-level radioactive waste shipments could cross their states safely.

### **Response**

DOE would comply with Nuclear Regulatory Commission regulations requiring notification to the governor or the governor's designee by mail or messenger [10 CFR 73.37(f)]. Governors would notify state and local safety officials, as appropriate, of the pending shipments. Tribes would receive notification if the Commission amended the regulation to allow such notice. In response to comments, additional information on the notification process is included in Section M.3.2.2.1 of the EIS.

Nuclear Regulatory Commission physical security regulations apply only to shipments of spent nuclear fuel; notification is not required for shipments of high-level radioactive waste. However, DOE intends to follow the same procedures for these shipments and for all unclassified shipments of DOE-owned spent nuclear fuel and other material, that could be shipped to Yucca Mountain. Notification procedures already in place would apply to shipments of naval spent nuclear fuel. The Nuclear Regulatory Commission has promulgated regulations for guards and escorts for spent nuclear fuel shipments that DOE would follow.

All vehicles (trucks and railcars) carrying spent nuclear fuel or high-level radioactive waste would be placarded in accordance with U.S. Department of Transportation regulations in 49 CFR Part 172, Subpart F. More information on these marking requirements is provided in Section M.2.2 of the EIS.

#### **8.7 (147)**

##### **Comment** - 13 comments summarized

Several commenters expressed concern about privatization of the transportation system. A common theme was that DOE cannot privatize or delegate to a contractor any key transportation responsibilities because of conflicts between transportation safety and the profit motivation of the private industry. One commenter stated concerns that many critical policy decisions would be improperly delegated to a contractor, such as the responsibility for selecting modes, routes, and casks, as well as the development of institutional plans and the preparation of an EIS addressing transportation. Several commenters referred to DOE's draft "Acquisition of Waste Acceptance and Transportation Services for the Office of Civilian Radioactive Waste Management." Commenters were concerned that privatization could interfere with emergency response and DOE's interactions with tribes and local and state governments.

##### **Response**

Section 137(a)(2) of the NWPB requires the Secretary of Energy to utilize private industry to the fullest extent possible in each aspect of transportation of spent nuclear fuel under the Act. At present, DOE plans to implement this requirement by contracting with private industry to provide equipment such as casks and transport vehicles, to provide training of utility personnel in the use of the equipment, and to provide the transportation of the loaded and unloaded casks between the generator sites and Yucca Mountain. The exact form of the contracts with private industry continues to be studied. In response to public comments, DOE added Appendix M to the EIS, which discusses planned operational policies, procedures, and protocols for transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain. Section M.3.1 contains more information on the acquisition of contractor services.

DOE's draft request for proposal for Regional Servicing Contractors requires that all bidders must meet certain qualification criteria and technical requirements. Each bidder must have performed a major transportation and logistics coordination project involving railroad, truck and/or intermodal carriage of radioactive, toxic, or other hazardous materials within the past 10 years as well as have a Nuclear Regulatory Commission-approved Quality Assurance Program. Bidders would be evaluated on their past performance and the degree to which their technical approach addresses the safety, operational, and logistical requirements of the program. Cost would be the last factor to be evaluated. Most important, DOE would continually assess the performance of each of the transportation contractors in relation to the contract.

DOE would retain responsibility for approval of routes to be proposed to the Nuclear Regulatory Commission in consultation with states, tribes, and local authorities (see Section M. 3.2.1.2 of the EIS). DOE would implement and administer programs that implemented Section 180(c) of the NWPB for routine transportation and emergency response planning and training. DOE would be responsible for working with the states and tribes to ensure their input was factored into the development of a national transportation program. DOE would work with the states and tribes to develop communication, training, and security plans (see Section M.6). If additional National Environmental Policy Act reviews for transportation activities were necessary, DOE would be the responsible agency.

#### **8.7 (153)**

##### **Comment** - 40 comments summarized

Commenters stated that DOE should improve its coordination and consultation with local and state communities, planning organizations, and other national organizations (for example the National Conference of State Legislatures), and develop a comprehensive transportation plan for the Final EIS. As written, the EIS is inadequate without such planning information because it did not consider the true complexities and management of a large-scale transportation program. If such comprehensive planning were included, DOE would have reached different conclusions than those presented in the Draft EIS.

The Waste Isolation Pilot Plant transportation program, which was developed cooperatively with affected states, was touted as the model that should be followed by DOE for the Yucca Mountain transportation program. In the context of transportation planning, commenters identified many issues that should be addressed, including the following:

- Federal/state/local cooperative agreements and DOE support, including (1) financial support for highway and rail improvements, maintenance, and rehabilitation; (2) financial support and training, equipment, materials, personnel, and coordination years before the first shipments to ensure the preparedness of involved agencies; (3) training and planning and preparedness sessions for state and local jurisdictions near shipment routes; (4) route coordination with state and local jurisdictions, and route identification for each generator site to the repository years before anticipated shipments; (5) review of accident and terrorism responses and responsibilities of all involved; (6) coordination and the supply of equipment for responses, tracking, record keeping and communications; (7) a prior commitment for needs assessment by state and local agencies for safety improvements, signing, signals, emergency crews, equipment, training, overall route improvements (rehabilitation, reconstruction and improvements); and (8) formation of a working committee of state and local jurisdictions years prior to the first shipment to facilitate coordination, cooperation, communications, and training.
- Local community criteria and relevant resolutions (for example, those of Nye County),
- Local community emergency-response capabilities, route planning, and selection to minimize shipments through highly populated areas or avoid Native American tribal lands,
- Provisions for contract carriers, shipment methods, accident prevention, cask testing, financial and technical assistance, potential for terrorism and sabotage, timetables for shipments, mitigation measures including highway maintenance and improvements, contingency planning, operation of the transportation system (for example, how many casks would be built, their lifetimes), organizational structure and management practices, field operations and provisions for these services by the Regional Servicing Contractor, and safe parking areas.

Commenters urged DOE to consult with communities in making future decisions regarding the mode of transport and rail corridors.

#### **Response**

DOE agrees that detailed, comprehensive planning would be required prior to the start of shipments to a repository. The level of planning suggested by many of the commenters, however, would be useful only when carried out closer to the time any rail or truck transportation would be scheduled to begin. Otherwise, the information upon which such planning was based would be likely to change before shipments could begin. Operational protocols for transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain are presented in the draft Request for Proposal, *Acquisition of Waste Acceptance and Transportation Services for the Office of Civilian Radioactive Waste Management* (DIRS 153487-DOE 1998). They are summarized in Section M.3 of the EIS. The *Waste Isolation Pilot Plant Transportation Safety Program Implementation Guide* (DIRS 156384-WGA 1995) protocols were used as a model for Yucca Mountain-related protocols. The Department expects to interact with affected stakeholders on routing and related local issues if the repository site is approved.

The number of highway and rail shipments required to transport all of the spent nuclear fuel and high-level radioactive waste to Yucca Mountain, under any of the scenarios analyzed, would be a very small fraction of the total number of highway and rail shipments throughout the country on a daily, monthly, or yearly basis. Therefore, the impact of the repository shipments on the transportation infrastructure would be small. If the repository was approved, DOE would discuss transport details with stakeholders, including financial support, before the start of shipments. If the heavy-haul truck implementing alternative was used extensively in Nevada, DOE would provide funds for highway upgrades and maintenance, as appropriate. If rail was the selected mode in Nevada, DOE would construct a branch rail line.

Section 180(c) of the NWPA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions the Department would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with

emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using a planning grant and based on availability of funds in annual Program budgets specified by Congress. Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures for implementation of Section 180(c) (63 *FR* 23753, April 30, 1998) is designed to provide adequate time for training of first responders in advance of the first shipments. If there was a decision to proceed with the development of a repository at Yucca Mountain, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

First responses to accidents would be the responsibility of the jurisdiction where the accident occurred. DOE and the transportation contractors would be available to provide assistance as requested. DOE would comply with the requirements of the Nuclear Regulatory Commission to ensure that shipments were properly safeguarded and met security requirements (see Section M.7 of the EIS).

As discussed in Section 1.5 and Appendix C of the EIS, throughout the scoping process and development of the EIS, DOE has encouraged broad participation in this National Environmental Policy Act process. DOE held 15 public scoping meetings, held Draft EIS public hearings in 21 locations across the United States held hearings on the Supplement to the Draft EIS in three locations in Nevada, and consulted and interacted with various government agencies, other organizations, and stakeholders across the country.

#### **8.7 (184)**

##### **Comment** - 19 comments summarized

Commenters expressed concern about measures to be taken to ensure safe transportation of spent nuclear fuel and high-level radioactive waste. The concerns include condition of the highways and railroads; inspection of old, deteriorating roads and bridges; and consideration of weather and temperature and their effects on roads, rails, and bridges. Commenters stated that actions should be taken to prevent derailments. Commenters stated that during transport, railroads and highways should be cleared, drivers and crews should have comprehensive training, drivers with records of violations should be excluded, there should be controls at crossings, and there should be buffer cars and security guards. Commenters expressed concern about the designation and acceptance of responsibility for accident response and cleanup, radiation monitoring of trains and trucks, and contamination control. Some commenters made suggestions for restrictions on the shipments, restrictions on routing, restrictions on time of day, restrictions around population centers, and the use of dedicated or special trains. Other commenters stated that careful plans should be developed and implemented (including risk minimization strategies) to ensure that proper measures are taken to ensure safe transportation of spent nuclear fuel and high-level radioactive waste.

##### **Response**

In response to these and other public comments, DOE has added information on proposed transportation activities to the EIS. Appendix M includes additional information on the regulations that govern spent nuclear fuel and high-level radioactive waste transportation, the proposed process that DOE would use to acquire commercial transportation services, and the expected operational details and protocols DOE would follow if the Yucca Mountain site was approved (see Sections M.2 and M.3).

DOE is required to follow Nuclear Regulatory Commission, U.S. Department of Transportation, and applicable state, Native American tribal, and local regulations and use Commission Certified casks when transporting spent nuclear fuel and high-level radioactive waste to a repository. DOE is confident that by implementing these regulations and using Commission Certified casks, this transportation can be carried out in a safe manner. Of the thousands of shipments completed over the last 30 years, none has resulted in an injury through release of radioactive material.

U.S. Department of Transportation regulations require carriers of spent nuclear fuel and other materials with a high level of radioactivity to use preferred routes that reduce time in transit. A preferred route for highway shipments is an Interstate System highway or alternate route selected by a state or tribe. Rail routes for shipping radioactive materials are determined by the shipper and the railroad companies based on safety, available trackage, schedule efficiency, and cost-effectiveness. See Section M.3.3.1.2 of the EIS for additional information on route selection.



At present, DOE intends to purchase services and equipment from Regional Servicing Contractors that would perform waste acceptance and transportation operations. The contractor providing transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments were conducted in a safe and efficient manner. Among other things, the plan would provide for the use of dedicated train service where this type of service could be demonstrated to enhance operating efficiency, dependability, and cost-effectiveness, or lessen the potential of adverse railroad equipment incidents (see Section M.3.1 of the EIS).

DOE could decide to use a dedicated train that carried only the material being shipped to Yucca Mountain, or could elect to move the spent nuclear fuel and high-level radioactive waste in general freight. If the material was shipped as general freight, the position of the spent nuclear fuel or high-level radioactive waste car in the train would be regulated by 49 CFR 174.85. This regulation requires that railcars placarded "radioactive" must be separated from a locomotive, occupied caboose, or carload of undeveloped film by at least one nonplacarded car, and it cannot be placed next to other placarded railcars of other hazard classes. Section J.2.3 of the EIS presents an assessment of impacts of using dedicated trains to transport spent nuclear fuel and high-level radioactive waste. Based on current information from the U.S. Department of Transportation and the Association of American Railroads, it is DOE's opinion that there is no clear advantage for using either dedicated trains or general freight service.

Drivers would be required to meet the qualifications specified in U.S. Department of Transportation regulations (49 CFR Part 391). They would also be required to complete the training called for in 49 CFR 177.816 (see Section M.3.2.1.7 of the EIS).

The radiation levels on the surface of casks carrying spent nuclear fuel and high-level radioactive waste to a repository would be measured prior to the shipment to ensure levels were within regulatory limits. Additional measurements could be made en route any time the shipment underwent an inspection.

As with any traffic accident, local, tribal, and state public safety officials would be the first to respond to accidents involving radioactive materials. Additional assistance could be requested from Federal agencies. Damages from the accident caused by the release of radioactive materials would be handled under the provisions of the Price-Anderson Act. Any damages caused by a non-nuclear accident (an accident not involving the release of radioactive materials or authorized precautionary evacuation) would be covered by the carrier's private insurance and handled through state tort law as with any other transportation accident.

## **8.7 (197)**

### **Comment** - 14 comments summarized

Commenters expressed a concern for safe transportation of spent nuclear fuel and high-level radioactive waste under routine conditions. They indicated a need for ensuring that the transportation contractor conducted business properly (for example, followed procedures, routinely inspected equipment, used safety Conscious drivers) and only permitted transport on the safest rails or roads. Other commenters questioned driver behavior and questioned whether relief drivers would be used. One commenter asked if staffing points for refueling would be identified ahead of time and publicized. Another commenter expressed specific concern with travel through rural areas, in particular if the vehicle was unescorted, since rural driving could be more hazardous and there would be no one available to call for help. A few commenters stated that the community, or at least the state or tribal government, should be informed when Yucca Mountain-bound shipments were traveling through their community. One commenter suggested independent inspections (mechanical and radiological) at the point of origin, mid-transport, and prior to acceptance at the Yucca Mountain site. One commenter stated their county would require additional services to monitor DOE. Commenters questioned who would supervise the suitability of the vehicle used in transport and expressed concern with the protocols to be followed in the event of a spill or leak.

### **Response**

In response to comments, the transportation regulations and operational protocols the shipping contractors would be required to follow have been included in Sections M.2 and M.3 of the EIS. The Nuclear Regulatory Commission and the U.S. Department of Transportation regulate the transportation of spent nuclear fuel and high-level radioactive waste. As a result of strict compliance with their regulations, thousands of shipments have been completed over the last 30 years, none of which has resulted in an injury through release of radioactive material.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors that would perform waste acceptance and transportation operations. DOE would ensure that its contractors providing transportation services for the repository abided by all applicable regulations at the time of transport.

DOE's draft Request for Proposal for Regional Servicing Contractors requires the contractors selected to provide transportation services must demonstrate that they have had successful experience transporting hazardous materials. Carriers would be required to develop and maintain a driver and crew training program that meets the requirements of 49 CFR 172.600 and 177.825. For more detailed information, see Appendix M of the EIS. Driver scheduling would ensure that the hours of service regulations in 49 CFR Part 395 could be met. The transportation contractor would be required to prepare a transportation plan that would include proposed routes and other information such as safe emergency parking areas and other planned stops. DOE would make the plan available to states and tribes for comment before the shipments took place. The carrier would be able to communicate to its dispatch center and others through various means of communication, including a satellite-based tracking system. This would enable the carrier to communicate problems even in remote areas (see Section M.3.1).

Inspections of highway shipments, including the vehicle, load, and driver, at point of origin and elsewhere as required, would be conducted in accordance with the procedures developed by the Commercial Vehicle Safety Alliance. Rail shipments would be inspected according to Federal Railroad Administration policy (see Section M.3.2.1.5 of the EIS).

Under Nuclear Regulatory Commission regulations, information regarding the time and date of shipments of spent nuclear fuel is restricted. States would receive advance notification of impending shipments in accordance with Nuclear Regulatory Commission regulation 10 CFR 73.37. Tribes would receive notification if the Commission amended the regulation to allow such notice (see Section M.2.5 of the EIS).

In the event of a transportation accident, first responders would follow their local procedures. Section 180(c) of the NWSA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using a planning grant and based on availability of funds in annual Program budgets specified by Congress. Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures for implementation of Section 180(c) (63 FR 23753, April 30, 1998) is designed to provide adequate time for training of first responders in advance of the first shipments. If there was a decision to proceed with the development of a repository at Yucca Mountain, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

## **8.7 (247)**

### **Comment** - 11 comments summarized

Several commenters requested that DOE provide ways to monitor shipments so that officials, states, and tribes as well as individuals, would know the locations of the shipments and supporting equipment at all times. Other commenters asked if trucks and rail cars would be marked and tracked and stated that the public has a right to know when and where shipments would take place. Concerns were expressed about a missing cask, or other problem such as O-ring failures, human error, vehicular accidents, or sabotage. Commenters wanted to know who would take the responsibility for these events. One commenter summarized the capabilities of the TRANSCOM system but questioned how DOE could measure health and safety impacts and emergency management mitigation needs if it is not clear how DOE plans to communicate with local entities. Several commenters expressed the concern that letting the public know when and where shipments will take place would increase the risk of terrorism.

### **Response**

In response to public comments, DOE provided additional information on the planned operational aspects of transportation in the EIS (see Section M.3). DOE and the transportation contractors would use the latest version of the TRANSCOM system, or a similar satellite-based tracking system, to provide continuous real-time position

tracking for all shipments. In addition, DOE continues to improve its tracking system based on lessons learned during actual shipments. As a result, DOE does not expect that a cask could be “missing” as suggested in a comment. The currently operational TRANSCOM system allows messages to be sent from the drivers and crew directly to the control center. Any unusual or unexpected situations encountered or any problems with the cask or other equipment would be immediately communicated to the control center. DOE intends to make satellite tracking information available to the states and tribes, subject to Nuclear Regulatory Commission determination that use of satellite tracking technology would be allowed by safeguards and security regulations in 10 CFR Part 73. Thus, there would be information on which to base requests for aid to local law enforcement or emergency response personnel as needed (see Section M.3.2.1.5).

Casks would be prepared for shipment under quality assurance procedures approved by the Nuclear Regulatory Commission. The casks and transporter would be inspected prior to shipment. Truck shipments would not be allowed to leave the waste generator site unless found to be defect-free, as required by the Commercial Vehicle Safety Alliance inspection procedures. Rail shipments would be subjected to railroad hazardous materials inspections prior to being accepted by a railroad for transportation. Inspections would occur along the route and at the repository destination. More information on inspection activities is provided in Section M.3.2.2.2 of the EIS.

Trucks and railcars carrying spent nuclear fuel and high-level radioactive waste would be placarded in accordance with U.S. Department of Transportation regulations. Placarding and labeling requirements for shipments are discussed in Section M.2.2 of the EIS.

The Nuclear Regulatory Commission would publish the routes the shipments would take. However, regulations at 10 CFR Part 73 require shipment schedules to be held as confidential safeguards information. DOE would comply with Nuclear Regulatory Commission regulations requiring notification to the governor or the governor’s designee by mail or messenger [10 CFR 73.37(f)]. Governors would notify state and local safety officials, as appropriate, of the pending shipments. Tribes would receive notification if the Commission amended the regulation to allow such notice. In response to comments, additional information on the notification process is included in Section M.2.5 of the EIS.

## **8.7 (905)**

### **Comment** - EIS000116 / 0004

As you look at the maps back here and as this audience looks at those maps on the walls, you’ve -- you’ve told us that virtually any public state highway coming into Nye County could be a potential route for a truck borne transportation of high-level waste, that there’s a number of routes that are proposed for rail routes.

So we have to be prepared and integrate into our planning for the next eight to ten years all possibilities for all those routes and all those modes.

You haven’t given us precise information on quantities, scheduling, and certainly as you heard here tonight, the public understanding of the risks associated with this document are poorly understand -- understood.

### **Response**

DOE evaluated the potential environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste from 5 DOE and 72 commercial sites to the proposed repository at Yucca Mountain. Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway route or rail lines DOE would use. In the interim, states or tribes may designate alternate preferred highway routes, and highways and rail lines might be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate route) that reduce time in transit (see Figure 6-11). DOE identified rail lines based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for shipment of radioactive materials (see Figure 6-12).

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada. If the Yucca Mountain site was approved, DOE would identify for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In response to public comments, DOE has included, state maps of representative highway routes and rail lines it used for analysis in Appendix J of the EIS (see Figure J-53 for the Nevada map). Section J.4 includes potential health and safety impact estimates associated with shipments for each state through which shipments could pass.

In response to comments on the Draft EIS, DOE prepared Appendix M to provide additional information on transportation regulations and the operational aspects of spent nuclear fuel and high-level radioactive waste transportation (see Sections M.2 and M.3 of the EIS). This information includes more details on how DOE would select transportation routes if the Yucca Mountain site received approval. The routes selected would comply with the applicable regulations in place at the time of shipment.

#### **8.7 (1673)**

##### **Comment** - EIS000461 / 0007

You got all this nonsense about money. Why are you worried about how much money you are spending on this issue? You don't seem to care. You go around spending money like drunken sailors until it comes to a point now we're worried about health and children. And now all of a sudden, it's a money issue. It doesn't make any sense.

##### **Response**

Much of the money used to characterize Yucca Mountain comes from the Nuclear Waste Fund, and DOE cannot spend money from this Fund for purposes not authorized by law. With regard to adequate funding, Congress annually determines the appropriate funding for the DOE Office of Radioactive Waste Management, based on appropriate requests from the Secretary of Energy and the President. DOE believes that Congress, having directed the Government to begin this project, would continue to fund it adequately to protect the public health and safety and the environment.

#### **8.7 (2066)**

##### **Comment** - EIS000599 / 0002

There is insufficient transportation analysis in it. This is one of the most glaring omissions in the statement itself. There is not a clear picture of where the transportation routes are going to be, how the waste is to be transported. How is the public to make a decision on the impacts when we're unclear how it is going to be transported?

The mode of transportation and the stopping points along the routes are unknown as well. So routine exposure on route cannot be properly evaluated either.

There is also, to my knowledge, still the possibility that the transportation may be privatized. If that is the case, then all bets are off. That is another unknown or are we yet to swallow? So that is a question also. Is privatization off the books, or is it still a possibility?

##### **Response**

Based on the results of the impact analyses presented in Chapter 6 and Appendix J of the EIS, as well as the results published in numerous other studies and environmental impact analyses cited in the EIS, DOE is confident that spent nuclear fuel and high-level radioactive waste can be and would be safely transported to Yucca Mountain. DOE believes, as the EIS reports, that the potential impacts of this transportation would be so low for individuals who live and work along the routes that these individual impacts would not be discernible even if the corresponding doses could be measured. The analysis presented in the EIS factored in the characteristics of spent nuclear fuel and high-level radioactive waste, the integrity of shipping casks that would be used in transport, and the regulatory and programmatic controls that would be imposed on shipping operations (see Section M.2). The EIS analytical results are supported by numerous technical and scientific studies which have been compiled through decades of research and development by DOE and other Federal agencies of the United States, including the Nuclear Regulatory Commission and the U.S. Department of Transportation, as well as by the international community, including the International Atomic Energy Agency.

DOE believes that the EIS adequately analyzes transportation-related impacts that could result from the Proposed Action. DOE also believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (either rail or truck shipments), as well as the choice among alternative rail corridors in Nevada, if the site is approved. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada. The reader is referred to the introduction to Chapter 8 of the CRD for additional information.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway route or rail lines DOE would use. In the interim, state or Native American tribal governments may designate alternate preferred highway routes, and highways and rail lines may be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate route) that reduce time in transit (see Figure 6-11). DOE identified rail lines based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for shipment of radioactive materials (see Figure 6-12). In response to public comments, DOE has included maps of the representative highway routes and rail lines for the 45 states it used for analysis in the EIS (see Section J.4). Section J.4 includes potential health and safety impacts associated with shipments for each state through which shipments could pass.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The Department has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. Section M.3.1 of the EIS contains more detail on the proposed role of the Regional Servicing Contractor.

## **8.7 (2203)**

### **Comment** - EIS000615 / 0001

The U.S. Navy has an EIS concerning welfare of sites in Smoky Valley where the proposed train route is. I want to know if the Navy or the DOE has interacted and taken this into consideration and worked together.

And did the DOE interact and work with the BLM [Bureau of Land Management] and U.S. Forest Service on lands in Lander County that they would go through.

### **Response**

Land use and ownership in the Carlin Corridor are discussed in Section 6.3.2.2.2 of the EIS. DOE is aware of the Fallon Range Training Complex Requirements Naval Air Station EIS, but chose not to hold formal consultation meetings with the Navy or other Federal agencies on it. The reason is that the size and number of electronic warfare sites is small in the Smoky Valley area, and would not be affected by the rail corridor (DIRS 148199-USN 1998).

The documents cited in Section 3.2 of the EIS are source documents used by DOE for land-use considerations and they include possible future actions within the transportation corridor. The more notable land-use features and potential influences that exist on lands within the corridors are presented in Section 6.3.2. For example, the land features within the Carlin Corridor are presented in Section 6.3.2.2.2. Commenters are referred to the corridor-specific sections of Section 6.3.2.2, where DOE identifies potential conflicts with existing or future land uses and land-use plans that could be affected by a given corridor.

As stated in Chapter 6 and Section 11.2.2 (subsection on Compliance with Floodplain/Wetlands Environmental Review Requirements), more detailed field surveys, government consultation, analyses, and appropriate National Environmental Policy Act reviews would be prepared if a decision is made to select a specific rail alignment within a corridor or a specific location of an intermodal transfer station or the need to upgrade the associated heavy-haul truck routes. These would include consultations with State wildlife management agencies, the Bureau of Land Management, the Army Corps of Engineers, and other applicable government agencies. They also would include

field surveys (as applicable) and more detailed assessments and analyses of wetlands and other waters; floodplains; sensitive species; effects of habitat fragmentation, interruption of movements, mortality, and harassment on wildlife, horses, and burrows; loss of hunter-generated revenue, spread of noxious weeds, and soils.

#### **8.7 (2311)**

**Comment** - EIS001888 / 0531

[Clark County summary of comments it has received from the public.]

Carriers should respond to all driver advisories and notification of delays and adjust routes accordingly. All vehicles should be inspected quarterly and display appropriate safety inspection stickers.

#### **Response**

DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. Section M.3.2.1.4 of the EIS provides a discussion of the protocols and procedures that would be implemented by a Regional Servicing Contractor and its subcontractors under adverse weather or road conditions. The procedures are in two parts.

One part of the procedure relates to preshipment planning, which would use available data relating to expected conditions. Shipments would not be dispatched on a route where expected conditions would not comply with the requirements in the procedures. Weather forecasts would be obtained by the Regional Servicing Contractor as part of the preshipment planning, and forecasts for rain, snow, fog, high winds, and tornado warnings would be considered in the determination of the shipment schedule. In general, Regional Servicing Contractors would be responsible for the planning, implementation, and control of the shipments, including responding to changing conditions, as necessary. A contractor would acquire information of road or highway construction that could temporarily affect the planned route. Through consultation with the affected states along the planned route, the contractor would obtain road and highway conditions and information on anticipated construction. Planning information on long-range highway construction provided by state highway departments would be given to the contractor.

The other part of the procedure relates to en route problems and is for those persons actually involved in making the shipment who would be best able to discuss and report expected and encountered conditions. DOE Protocols, which would be implemented by the Regional Servicing Contractors, require that shipments would not travel when severe weather conditions along routes or adverse road conditions would make travel too hazardous to proceed. Driver and crew communications with the control center would provide advanced warning of potential adverse conditions along the route. If unanticipated severe weather or adverse road conditions were encountered, the driver and crew would contact the control center to coordinate routing to a safe parking or stopping area if it became necessary to delay the shipment until conditions improved. Section M.3.2.1.3 of the EIS provides detailed information on the selection of safe parking areas to be used in the event a shipment had to be delayed.

Casks would be prepared for shipment under quality assurance procedures approved by the Nuclear Regulatory Commission and the casks and transporter would be inspected prior to shipment. Truck shipments would not be allowed to leave the waste generator site unless found to be defect free as required by the Commercial Vehicle Safety Alliance inspection procedures. Rail shipments would be subjected to railroad hazardous materials inspections prior to being accepted by a railroad for transportation. Inspections would occur en route and at the repository destination. More information on inspection activities is provided in Section M.3.2.2.2 of the EIS.

#### **8.7 (2874)**

**Comment** - EIS001100 / 0003

Every stop along the way and every time the waste is handled would cause some contamination. An expert from a firm that deals with cleaning up disasters said at a public meeting in St. Louis that homes within a 1/4 mile of the tracks would receive a dose of radiation comparable to leaving an x-ray machine on night and day for thirty years.

#### **Response**

The spent nuclear fuel or high-level radioactive waste would be handled only twice; once while loading the material into the transportation cask at the generator site and once while unloading the material at the repository from the transportation cask and transferring it to the disposal package. In both cases, the operation takes place in a building

designed for this with the objective of protecting the public and the environment from contamination. The transportation cask is designed to protect the public and the environment from contamination and radiation while the material is being shipped.

The U.S. Department of Transportation routing requirements, along with regulatory requirements to limit radiation dose external to a shipping cask, help to ensure that radiation dose to persons who live along routes would be low. Exposure to the public under incident-free conditions is discussed in Sections 6.2.3.1 and J.1.3.2.1 of the EIS. An analysis was done to determine the amount of radiation exposure to the “maximally exposed individual (MEI).” The MEI is a hypothetical person who would receive the highest dose. The EIS estimates the dose to persons who would drive alongside the trucks as they travel on the highways, who would be stopped in locales where truck shipments stop, and who live along the routes that would be used. In response to public comments, DOE forecasted growth in populations along routes in order to improve its estimates of potential impacts that could occur in the future when shipments would occur. However, the estimated dose to an individual living along a route would not change with changes in population - only the integrated dose to the whole population would change. The dose for an individual who lived along a route would be an average of about 0.008 millirem per year. This is more than 30,000 times less than average annual background radiation in the United States and less than one-one thousandth of the dose from a chest X-ray.

#### **8.7 (3323)**

##### **Comment** - EIS001002 / 0003

Neither science nor industry has figured out how to clean up an oil spill; imagine radioactive spills! To avoid accidents, will you close down the highways every other day as another shipment passes by? That is a lot of logistical planning and citizen inconvenience. If you are worried about terrorists, will you be able to announce the routes and slowdowns or closures in advance? Will I and other drivers want to share the highways with a nuclear convoy? Or will I get used to the risks and drive anyway? As I understand from my reading, designs for transports, routes and contingency plans have not been prepared yet.

##### **Response**

Spent nuclear fuel and high-level radioactive waste are not easily dispersed; they do not readily dissolve in water; they are not liquids or gases that can be easily spilled or leaked, and radiation from them does not make other materials radioactive. Spent nuclear fuel and high-level radioactive waste are solids. They are hard, tough, and dense ceramics, metals, or glasses contained within tough metal barriers. The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

There are no plans to routinely close highways during shipments to a repository. Shipments of spent nuclear fuel have been made safely in this country for many years without having to resort to highway closures. Shipments would be subject to safeguards regulations of the Nuclear Regulatory Commission (10 CFR 73.37) that are designed to minimize the already small potential for sabotage attacks. Additional information on the physical protection of spent nuclear fuel and high-level radioactive waste during transportation can be found in Section M.7 of the EIS. DOE would comply with Nuclear Regulatory Commission regulations requiring notification to the governor or the governor’s designee by mail or messenger [10 CFR 73.37(f)]. Governors would notify state and local safety officials, as appropriate, of the pending shipments. Tribes would receive notification also if the Commission amended the regulation to allow such notice. Additional information on the notification process is included in Section M.2.5.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway routes or rail lines could be used. In the interim, states and tribes may designate alternate preferred highway routes, and highways and rail lines could be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate route) that reduce time in transit (see Figure 6-11). Rail lines were identified based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials (see Figure 6-12).

#### **8.7 (3427)**

**Comment** - EIS001160 / 0125

The DEIS should describe time of day, day of week and seasonal characteristics of shipping campaigns. Would there be an effort for shipments to occur during low season traffic times?

#### **Response**

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations (see Section M.3 of the EIS). The contractor providing transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments are conducted in a safe and efficient manner. DOE's draft Request for Proposal requires the contractors selected to provide transportation services must demonstrate that they have had successful experience transporting hazardous materials. The transportation contractor would be required to prepare a transportation plan that would include proposed routes and other information such as safe, en route emergency parking areas and other planned stops.

DOE expects that shipping rates would be approximately uniform throughout the year for both rail and highway shipments. The issue of restricting hours of operations is covered in the protocols, which require the Regional Servicing Contractors to consider preferred time of day travel through urban areas in their route planning. Many local governmental organizations have time-of-day restrictions for certain types of traffic (for example, no heavy-haul truck traffic on certain highways during rush hours). DOE shipments only observe applicable restrictions. In addition, DOE transportation contractors are required to closely monitor road and weather conditions to be certain that conditions are acceptable for safe vehicle operation.

#### **8.7 (3430)**

**Comment** - EIS001160 / 0128

Would shipments be scheduled to occur during low traffic or high traffic hours, being moved at night or during the day?

#### **Response**

DOE expects that shipping rates would be approximately uniform throughout the year for both rail and highway shipments. The issue of restricting hours of operations is covered in the protocols, which require the Regional Servicing Contractors to consider preferred time of day travel through urban areas in their route planning. Many local governmental organizations have time-of-day restrictions for certain types of traffic (for example, no heavy-haul truck traffic on certain highways during rush hours). DOE shipments observe applicable restrictions. In addition, DOE transportation contractors are required to closely monitor road and weather conditions to be certain that conditions are acceptable for safe vehicle operation (see Section M.3.2 of the EIS).

#### **8.7 (3796)**

**Comment** - EIS001272 / 0006

The majority of high-level radioactive waste generated in the North Eastern part of the United States will be transported through the city of Cleveland, OH, and its suburbs. This puts many people, including my family, friends, co-workers, and neighbors at risk when an accident occurs. I have never had a voice in choosing the method of generating electricity, and I had no choice in which electric company would provide power to my home. I would never have chosen a company that built nuclear power plants for my provider, had I been given the choice. I hope



that I may have a voice in deciding if this highly toxic and dangerous waste should journey across the country and across my backyard, putting every person along the route at risk, EVERY DAY FOR 24 YEARS.

**Response**

In response to public comments, DOE has included maps of the representative highway routes and rail lines for the 45 states it used for analysis in the EIS (see Figure J-41 of the EIS for the representative Ohio routes). It also included potential health and safety impacts associated with shipments for each state through which shipments could pass. Table J-81 lists the estimated number of legal-weight truck shipments of spent nuclear fuel and high-level radioactive waste that would either originate or pass through Ohio. The table also lists the estimated number of rail shipment through Ohio in the mostly rail scenario for each of the candidate Nevada rail corridors and heavy-haul truck routes.

If the Yucca Mountain site was approved, under the mostly legal-weight truck scenario, the estimated total number of truck shipments through Ohio would be 17,258 over 24 years, approximately 2 truck shipments per day (total number of shipments would be 52,786). There would be no rail shipments over the 24-year period.

The estimated numbers of shipments passing through Ohio under the mostly rail scenario are less than the mostly legal-weight truck scenario. According to Table J-81, the number of rail shipments through Ohio would be approximately 2,381. This is less than 1 shipment per day over 24 years. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low.

DOE believes that its public involvement process during the development of the EIS is consistent with Council on Environmental Quality and DOE regulations on implementing the National Environmental Policy Act, and DOE guidance on public participation during the preparation of EISs.

The procedures used by DOE for the development of this EIS provided for public input at hearings and by written submissions. The Nuclear Regulatory Commission during its review of the license application for Yucca Mountain will provide similar opportunities for public input. Therefore, the public does have a voice in the decision of how to solve the nuclear waste problem in the United States.

**8.7 (4231)**

**Comment** - EIS001160 / 0046

Can the experience of transport of low-level and transuranic nuclear waste and impacts (i.e. Waste Isolation Pilot Plant (WIPP) and shipments to Nevada Test Site) be used as a model for the Yucca Mountain repository? To what extent was WIPP Program Implementation Guide for transportation considered as a model for Yucca Mountain regarding mitigation within the DEIS? Was the experiences of these other shipping campaigns used as examples to assess community impacts and transport accident rates within the DEIS?

**Response**

In response to public comments, DOE has added Appendix M to the EIS to provide further information on topics concerning transportation of spent nuclear fuel and high-level radioactive waste to Yucca Mountain. These topics include liability for transportation accidents, emergency management, cask safety and testing, and transportation services acquisition and protocols.

DOE is utilizing Waste Isolation Pilot Plant experience for planning its transportation program. The operational protocols to be used by the transportation contractors are similar to those in the *Pilot Plant Program Implementation Guide* (DIRS 156384-WGA 1995; see Section M.3 of the EIS). DOE would use vehicle inspection criteria and procedures, developed by the Commercial Vehicle Safety Alliance, for all truck shipments to a repository. These

are the same procedures that are being used successfully on the Waste Isolation Pilot Plant shipments. They place requirements on these shipments that go beyond those required for shipments of other hazardous materials. In addition, the experience gained from the emergency planning associated with Waste Isolation Pilot Plant shipments would be factored into the planning for repository shipments and the implementation of Section 180(c) of the NWPA (see Section M.5).

The Yucca Mountain EIS uses procedures comparable to those used by the Waste Isolation Pilot Plant for the assessment of community impacts.

#### **8.7 (4244)**

**Comment** - EIS001160 / 0058

The DEIS does not appear to address where and how relief drivers will be stationed or where and how these drivers will stop and park their trucks for meals, vehicle maintenance, fuel, etc. In addition, the DEIS does not address the qualifications of drivers and their respective knowledge in handling vehicle breakdowns or equipment failures as a means to mitigate risk. These issues need to be addressed in the FEIS.

The DEIS does not address restrictions in hours of operations for truck shipments as a possible measure to mitigate exposure risk in communities. For example, shipments could be restricted from passing schools at the beginning and end of each school day.

The DEIS does not consider the availability of specialized equipment which may be needed to transfer shipping casks from one vehicle to another while in transient. Delays in availability of such equipment may exacerbate exposure risks. This information must be considered in the FEIS.

#### **Response**

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The contractor providing transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments are conducted in a safe and efficient manner. DOE's draft Request for Proposal requires the contractors selected to provide transportation services must demonstrate that they have had successful experience transporting hazardous materials. Carriers would be required to develop and maintain a driver and crew training program that meets the requirements of 49 CFR 172.600 and 177.825 (see Section M.3.2.1.7 of the EIS). Driver scheduling would ensure that the hours of service regulations found in 49 CFR Part 395 could be met. The transportation contractor would be required to prepare a transportation plan that would include proposed routes and other information such as safe, en route emergency parking areas and other planned stops. DOE would make the plan available to states and tribes for comment before the shipments take place. The carrier would be able to communicate to its dispatch center and others through various means of communication, including the satellite-based tracking system. This would enable the carrier to communicate problems even in remote areas (see Section M.3.2.1.5).

The issue of restricting hours of operations is covered in the protocols, which require the Regional Servicing Contractors to consider preferred time of day travel through urban areas in their route planning.

The Regional Servicing Contractor would be required to provide detailed written procedures for how it would respond to an incident and arrange for repair/replacement of equipment or recovery, as appropriate. In accordance with ANSI N14-27 (DIRS 156289-ANSI 1987), the carrier is expected to provide appropriate resources for dealing with the consequences of an accident, isolating and cleaning up contamination, and maintaining working contact with the responsible governmental authority until the latter has declared the incident to be satisfactorily resolved and closed. Section M.3 of the EIS contains more detail on the proposed role of the Regional Servicing Contractor.

#### **8.7 (4310)**

**Comment** - EIS001160 / 0120

Page 11-10: Department of Transportation Hazardous Materials Packaging and Transportation Regulations 49 CFR: 4th paragraph. These regulations "attempt" to reduce potential hazards. At present, the Department of Transportation does not regulate the routing of rail shipments of radioactive materials. The EIS does not address the environmental impact of an accident using specific rail routes for radioactive materials.

**Response**

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict accurately which highway routes or rail lines DOE could use. Before such shipments began, states and tribes may designate alternate preferred highway shipping routes, and highways and rail lines could be built or modified.

Nonetheless, the representative highway routes identified for the EIS analysis conform to U.S. Department of Transportation regulations (49 CFR 397.101). These regulations, developed for transport of Highway Route Controlled Quantities of Radioactive Materials, require such shipments to be on preferred routes selected to reduce the time in transit. A preferred route is an Interstate System highway, bypass, or beltway, or an alternate route designated by a state or tribal routing agency. Alternate routes could be designated by states or tribes under Department of Transportation regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with local jurisdictions and other states and tribes (see Figure 6-11). Federal regulations do not restrict the routing of rail shipments. However, for the analysis, as discussed in Section J.1.1.3 of the EIS, DOE assumed routes for rail shipments that would provide expeditious travel and the minimum number of interchanges between railroads (see Figure 6-12).

DOE believes that the EIS adequately analyzes transportation-related impacts that could result from the Proposed Action. DOE also believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (either rail or truck shipments), as well as the choice among alternative rail corridors in Nevada, if the site is approved. The introduction to Chapter 8 of this Comment-Response Document contains additional information.

DOE does not believe it necessary to consider population characteristics on a community-by-community basis to determine potential public health and safety impacts from the transportation of spent nuclear fuel and high-level radioactive waste. The use of widely accepted analytical tools, latest reasonably available information, and cautious but reasonable assumptions if there are uncertainties, offer the most appropriate means to arrive at conservative estimates of transportation-related impacts.

**8.7 (4430)**

**Comment** - EIS001042 / 0005

Training to handle and monitoring of safety concerns involving the railroads and truck fleets that would be used are inadequate to the task. Will the U.S. DOE hire and train a specialty truck fleet just for this job? Or will the contract(s) go, as is usually the case with government contracts, to the lowest bidder?

**Response**

Section 137(a)(2) of the NWPA requires the Secretary of Energy to utilize by contract private industry to the fullest extent possible in each aspect of transportation of spent nuclear fuel under the Act. At this time, DOE plans to use private industry, including railroads, to the maximum extent possible, to accomplish its transportation mission. Such an arrangement, however, would not jeopardize the relationships and agreements that have been developed between DOE and stakeholders. DOE would retain responsibility for policy decisions, stakeholder relations, final route selection, and implementing Section 180(c) of the NWPA. One of the qualifications that must be met by a successful bidder would be to have performed a major transportation and logistics coordination project involving railroad, truck, or intermodal carrier of radioactive, toxic, or other types of hazardous materials within the past 10 years.

DOE has developed a possible private sector acquisition process. The acquisition process is described in Section M.3.1 of the EIS. A draft Request for Proposal for Acquisition of Waste Acceptance and Transportation Services has been published (DIRS 153487-DOE 1998). If Yucca Mountain was recommended as a repository site, the final request would be issued after the recommendation. There would be from two to four contractors selected to transport the spent nuclear fuel from the waste generator sites to Yucca Mountain. The current plan is to have a contractor for each of the four Nuclear Regulatory Commission regions in the contiguous United States; a single contractor could be assigned to no more than two of the regions. Each contractor would be responsible for providing all necessary casks, transport vehicles and other equipment, and transportation services. All bidders must

meet certain qualification criteria and technical requirements. Each bidder must have performed a major transportation and logistics coordination project involving railroad, truck and/or intermodal carriage of radioactive, toxic, or other hazardous materials within the last 10 years. In addition, each bidder must have a Commission-approved quality assurance program. Bidders would be evaluated on their past performance and the degree to which their technical approach addresses the safety, operational, and logistical requirements of the program. Cost would be the last factor to be evaluated.

#### **8.7 (5278)**

##### **Comment** - EIS000968 / 0002

The DEIS does not adequately address the financial impact of the repository and the transportation thereto. How can the Local Emergency Planning Committee (LEPC) prepare for emergencies when there is no starting point on fiscal impacts? Specific questions that need to be answered are:

1. What will it cost to monitor the transportation program for the life of the project?
2. What is the estimated cost to prepare for and respond to the maximum reasonably foreseeable accident (MRFA)?
3. Does the Price-Anderson Act, the Stafford Act or a combination of both cover the costs if an evacuation is necessary as the result of an accident? This needs to include long term shelter and business losses.
4. What are the financial impacts on our healthcare system? Do they have the equipment/training necessary to deal with the everyday effects of exposure? In the MRFA do we have enough hospital beds or providers? How much will it cost to prepare?
5. Much of the DOE document discusses Grant funding for costs anticipated with the development of Yucca Mountain. However, Grants are discretionary and Nevada would be competing with every State effected by transportation, should not a fixed funding source be identified?
6. Affected areas have no mass Community Warning System other than the Emergency Alert System. What will it cost to create a useful warning system to notify the public in the event of an emergency?
7. Public safety training is not addressed. In large communities you may have experienced Hazardous Materials Response Teams, but in most rural areas the first responders will be volunteers. Ongoing training will need to be addressed for the life of the project.

##### **Response**

In response to comments, DOE has revised the EIS by adding Appendix M to provide additional information on DOE funding for improvements in emergency response training and capabilities along the routes (see Section M.5). State and Native American tribal governments have primary responsibility to respond to and to protect the public health and safety in their jurisdictions from accidents involving radioactive materials. However, Section 180(c) of the NWSA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using an up-front planning grant and based on availability of funds in annual Program budgets specified by Congress.

Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures for implementation of Section 180(c) of the NWSA (63 *FR* 23753, April 30, 1998) is designed to provide adequate time for training of first responders in advance of the first shipments. Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

Specific responses:

1. The EIS does not include an estimate of the cost to state, local, and tribal governments to monitor the transportation program for the life of the project. DOE and the transportation contractors would use the latest version of the TRANSCOM system (see Section M.3.2.1.5 of the EIS), or a similar satellite based tracking system, for providing continuous real-time position tracking for all shipments. In addition, DOE intends to make satellite tracking information available to the states and tribes, subject to Nuclear Regulatory Commission determination that use of satellite tracking technology would be allowed by safeguards and security regulations in 10 CFR Part 73. Thus, there would be information on which to base requests for aid to local law enforcement or emergency response personnel as needed.
2. In response to public comments, Section J.1.4.2 of the EIS discusses the costs of cleanup following a severe transportation accident. This discussion reviews calculations of land area contaminated and costs for cleanup presented in past studies, including a report used in the 1986 environmental assessments, and information submitted by the State of Nevada in its public comments on the Draft EIS. This information included estimates of cleanup costs as high as \$9.4 billion. The studies included cost data compiled from case studies involving actual cleanup of radioactive contamination. In addition, the studies address consequences for releases of radioactive materials in communities. Although the studies project high costs for cleanup following severe accidents, the accidents evaluated are very unlikely and, as a consequence, the economic risks of transportation accidents would be very small.
3. The Price-Anderson Act establishes a system of financial protection (compensation for personal injury and property damage, including loss of use of property) for the public in a nuclear accident, regardless of who causes the damage. See Section M.8 of the EIS for a discussion of the Price-Anderson Act. The Price-Anderson Act would indemnify any person held liable for damage including cleanup of released radioactive materials.
- 4 and 6. In the unlikely event someone was contaminated as the result of an accident involving shipments to a repository, there are several means to deal with such incidences. The Department has several programs available to provide assistance to state, tribal, and local governments in response to radioactive material accidents. The Radiological Assistance Program, for example, provides trained personnel with equipment to evaluate, assess, advise, and assist in the mitigation and monitoring of potential immediate hazards associated with a transportation accident. As part of the program, DOE maintains eight Regional Coordinating Offices across the country that are staffed 24 hours a day, 365 days a year. The staff consists of nuclear engineers, health physicists, industrial hygienists, public affairs specialists, and other personnel who provide field monitoring, sampling, decontamination, communications, and other services, as requested. In addition, DOE's Radiation Emergency Assistance Center/Training Site (REAC/TS) focus on providing rapid medical attention to people involved in radiation accidents. REAC/TS maintains a 24-hour response center to provide direct support, including deployable equipment and personnel trained and experienced in the treatment of radiation exposure to assist Federal, state, tribal, and local organizations.
- 5 and 7. Section 180(c) of the NWPA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using an up-front planning grant and based on availability of funds in annual Program budgets specified by Congress. Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

**8.7 (5425)**

**Comment** - EIS000323 / 0001

First of all, the international experience with spent nuclear fuel shipments is absolutely irrelevant to what we're talking about in this EIS. I will not belabor the point except to say most of the long-distance experience in the

international area is with water transportation, not being proposed in the U.S. Most of the land-shipment experience is in England or in France, to a lesser extent in Germany, with relatively short land shipments. Until someone makes a compelling case that those shipments are relevant based on the comparability characteristics of the shipments that are being proposed for Yucca Mountain, I suggest we put that one to sleep.

Now, a more interesting question is, how relevant are the past shipments in the United States, given their characteristics? I would argue first that the naval fuel shipments are of no relevance whatsoever because of robust physical construction of naval reactor fuel which, after all, is designed for combat conditions and, secondly, because of the special protocols under which that fuel is shipped.

The real issue is, how relevant are the past shipments of the civilian industry in the United States to what's being proposed for Yucca Mountain? Turn to the database maintained by the Nuclear Regulatory Commission. The best data that we have comes from that source through the public information circular on irradiated fuel shipments. That database begins in 1979. It doesn't include a few of the DOE shipping campaigns like the across Country shipments from Surrey and Three Mile Island to Idaho, but it includes just about everything else including a lot of research reactor shipments. And when people give you this 3,000 shipments, you know, a lot of these shipments contained a piece of fuel rod, small research reactor assembly, and are in no way comparable to what the Department of Energy is proposing. So look, for example, at what the numbers are. Amount shipped between 1979 and 1995: a total of 1,335 metric tons uranium. That's an average of 79 metric tons uranium. Okay, that's equivalent to about eight casks that the DOE will ship in the future. Look at the total number of shipments in that period, 1,306. That's an average of 77 shipments per year. You know, they'll be shipping more than that per month, in some cases maybe that much by week under one of the scenarios that they're talking about in the Draft EIS. No, in the past, truck shipments, not a very good experiential base for people who are talking about a heavily rail scenario, although I will argue that in fact they'll be real lucky if they move 65 percent of the inventory by rail, and frankly I would consider that a real good target for them to be shooting for.

Now, the real issue is distance. Over the last 15 years, guess what the average rail shipment has been. Three hundred and fifty-six miles. In fact, 80 percent of the shipments have been less than 500 miles. And when you look at the truck shipments, you find the average shipment distance has been a little longer, 678 miles; but even there you find that 82 percent of the shipments are less than 900 miles. Now, the average distance for both rail and truck shipments is going to be about 2,200 miles when you average out all the sites in the U.S. And I would submit that that means greater likelihood of equipment failure, greater likelihood of human error and certainly greater likelihood of human error and certainly greater likelihood of bad luck in the way of accidents caused by other vehicles, bad weather, natural disasters and so forth.

Finally, what we haven't talked about, my third point, is if the industry wants to tell us a success story and say, "Base your transportation program on a success story," they have to look no further than the Waste Isolation Pilot Plant in New Mexico. Unfortunately, the DOE has chosen to ignore the lessons learned from the only good transportation campaign that they've planned. Why is that program accepted by the western states affected by it? Why is it endorsed by all the western governors? We haven't had a governor in Nevada saying anything good about DOE for, you know, many, many years; but they've all endorsed this program. The principles are this: one, the shipping casks were physically tested full scale. Whether they needed to be or not, the demonstration and the proof of the pudding was laid on the table where people could see that the containers actually met the NRC [Nuclear Regulatory Commission] performance standard. Some of these tests are boring, you know. You drop it in one orientation. You pick it up, you drop it again, you drop it again, you roast it and so forth. But, you know, as boring as that may sound, there's nothing in the world like showing people a video that shows honest testing and shows the package surviving. And when the earlier version failed, we found out there was a problem with the O-rings that would allow particles to escape from the package, and that was fixed. So sometimes you learn things. It's just like in the old Sandia tests where we found out that the tie downs that hold the cask to the trailer are just as important as the integrity of the cask. So number one, the WIPP program is accepted because of full-scale testing of the package.

Number two, routes have been out there for ten years. They came out in the Draft EIS. Some people didn't like them. Down in New Mexico the routes caused so much controversy that the State Legislature took the authority away from one agency and gave it to another, but in the end they came up with routes that were acceptable to the people of New Mexico. You can't do that unless you're starting with a discussion of the routes and you take input

from all parties, and that's how you solve the problem. DOE seems not to have learned the second big lesson from WIPP.

The third big lesson of WIPP is those regulations that some of you guys in the industry think are great -- well, maybe they are, maybe they aren't. But a big advantage in terms of public credibility came about when the DOE guys on the WIPP program said, "You know what? We're willing to go beyond the minimum that the regulations require in two areas, accident prevention and emergency response."

So when somebody comes to you and says here's all this experience in Europe, you ask them to prove to you that the characteristics of the European shipments have some relevance to this. When someone says, oh, we've got this great experience in the U.S. remind them most of the shipments in the U.S. took place over 20 years ago. The great utility people like Howard Schieman (phonetically) from WEPCO and Paul Standish from Westinghouse -- they've all retired; they're not around anymore. One of the problems in the utility business will be they don't have a lot of people who've got hands-on experience with PWR and BWR fuel kind of shipments. But the characteristics of the shipments, I think, are more important than the people; and the characteristics don't tell you anything.

And finally, when somebody says they don't know how to please those people, those crazy people in Nevada who can't seem to find anything good the DOE does, you remind them that the State of Nevada endorsed the transportation and safety protocols that they developed for WIPP. And that's the yardstick that we hope their colleagues at the Office of Civilian Radioactive Waste management will eventually wake up and follow the example that has been set.

#### **Response**

DOE believes that all past spent nuclear fuel shipping experience, international and domestic, would be relevant to planning for shipments of spent nuclear fuel and high-level radioactive waste if the Yucca Mountain site was approved. In addition, the operational protocols to be used by the transportation contractors are similar to those in the *Pilot Plant Program Implementation Guide* (DIRS 156384-WGA 1995) (see Section M.3 of the EIS). DOE would use vehicle inspection criteria and procedures, developed by the Commercial Vehicle Safety Alliance, for all truck shipments to a repository. These are the same procedures that are being used successfully on the Waste Isolation Pilot Plant shipments. They place requirements on these shipments that go beyond those required for shipments of other hazardous materials. Furthermore, the experience gained from the emergency planning associated with Waste Isolation Pilot Plant shipments would be factored into the planning for repository shipments and the implementation of Section 180(c) of the NWSA.

In response to public comments, DOE has added Appendix M to the EIS to provide further information on topics concerning transportation of spent nuclear fuel and high-level radioactive waste to Yucca Mountain. These topics include liability for transportation accidents (Section M.8), emergency response (Section M.5), and transportation services acquisition and protocols. Appendix M discusses protocols for managing adverse weather and road conditions (Section M.3.2.1.4) and driver training (Section M.3.2.1.7).

DOE has added information on the safety and testing of transportation casks (see Section M.4 of the EIS). In addition, based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 presents consequences for accidents that could release radioactive materials.

The TRUPACT package used in the Waste Isolation Pilot Plant program is completely different from the spent nuclear fuel casks to be used for shipment to Yucca Mountain. It has relatively thin walls and a different type of seal. Full-scale testing was appropriate for this type of package. However, many types of spent nuclear fuel casks have been certified by the Nuclear Regulatory Commission without full-scale tests being performed on the designs. The Commission is currently conducting a Package Performance Study that might include full-scale testing of a typical spent nuclear fuel transport cask. DOE is monitoring this study closely and will comply with any revised regulations that result from the study.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway or rail lines would be used. For example, in the interim, state or Native American tribal governments might designate alternate preferred highway routes and new highways and rail lines could be constructed or modified. Therefore, for purposes of analysis in the EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate route) (see Figure 6-11). DOE identified rail lines based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials (see Figure 6-12).

The final routes would be selected following the requirements and protocols outlined in the Draft Request for Proposals for Regional Servicing Contractors (DIRS 153487-DOE 1998; see Section 3.2.1.2 of the EIS). DOE and its shipping contractors would consult with the states and tribes along proposed routes in a procedure similar to that used for Waste Isolation Pilot Plant route selection. DOE would submit selected routes to the Nuclear Regulatory Commission for approval.

DOE believes that the mostly rail scenario, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. In reaching this conclusion, DOE considered the capabilities of the sites to handle larger (rail) casks, the distances to suitable railheads, and historic experience in actual shipments of nuclear fuel, waste or other large reactor-related components. DOE also considered relevant information published by sources such as the Nuclear Energy Institute and the State of Nevada. In addition, DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

#### **8.7 (5688)**

**Comment** - EIS001887 / 0302

In the Draft EIS Summary document (p. S-21), DOE states that legal-weight vehicles would not require special state-issued permits to transport HLW [high-level radioactive waste] or SNF [spent nuclear fuel]. This statement is not correct. These vehicles would still need valid hazardous materials transport permits to enter and traverse Nevada with such loads.

#### **Response**

Section 6.2.1 of the EIS refers only to the special overweight permits that would be required if the weight of the truck were to exceed 80,000 lbs. This type of permit would not be required for shipments on legal-weight trucks, but they would be needed if a large rail cask were loaded on a heavy-haul truck.

All permits required by the State of Nevada, or any local jurisdiction traversed by the shipment, would be obtained by DOE in accordance with the applicable regulations. In Nevada, these permits would be those required by the Nevada Administrative Code and could include a Certificate of Registration or a Hazardous Material Triennial Permit. County or city hazardous material permits or certificates would be obtained as necessary.

#### **8.7 (5755)**

**Comment** - EIS001887 / 0359

Page 9-18; Section 9.3.3.2 - Groundwater

The Draft EIS does not discuss potential impacts to groundwater from an accident occurring during transport.

#### **Response**

The shipping casks used to transport spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged and the casks would be designed to be watertight even after a severe accident. Furthermore, the high-level radioactive waste would be in a solid form that would not be easily dispersed (ceramics, metals, or glasses).



Numerous tests and extensive analyses, using the most advanced analytical methods available, have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Thus, it is extremely unlikely that an accident that resulted in a cask falling into any body of water would result in surface water contamination, let alone groundwater. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

As discussed in Section J.1.1.4, the EIS does not specifically analyze a transportation accident involving contamination of surface water or groundwater. While small particles generated by the impact forces and driven out of the cask by a severe fire (which would be extremely unlikely because there would be no fuel to sustain an engulfing fire of the type required in order to release radioactive material), might ultimately end up contaminating soils and surface waters outside the cask, this would not be the dominant pathway for radiological exposure and uptake after an accident.

## 8.7 (5817)

### **Comment** - EIS001802 / 0002

We have heard a lot of talk about earthquakes in Nevada, but I've lived 18 years with the notion that there may be -- it's not may and it's not if, it's when the major earthquake will occur along the New Madrid fault.

I can't quote my specifics at this point, but the New Madrid fault, St. Louis is on the north end. It would extend all the way down to the Memphis area along the Mississippi River, the St. Louis area and the areas to the south all the way to Cape Girardeau consist of soils that are very unstable in the event of a major earthquake. Those of us who are privy to a lot of information can literally see buildings, all unreinforced masonry buildings in the City of St. Louis collapsing in the event of a major earthquake, not to mention the bridges across the river in St. Louis, Cape Girardeau, points north and points south.

The material that's been presented here this evening, in going through some of it, I see scenarios painted whereby over the next 24 years there would be three rail shipments per year through Missouri, for the next 40 years there would be two trucks a day which is 14 trucks per week going through St. Louis, and then as a slight-aside I hear mention of barge traffic which puts barge transport up and down the Mississippi possibly for these cartridges, and what I see -- and the probability of a major, I believe a magnitude of 6.8 or greater earthquake occurring on the New Madrid fault is extremely high for the next 15 years, and it's almost imperative that it will happen within the next 30, if I understand my previous training.

And then when I see a picture of two trucks a day moving through St. Louis through the rush hour traffic, not to mention the three trains a week and the barge traffic and you have painted some of your scenarios about how the casks were treated in the event of accidents, but I didn't read anything that would approximate a building falling on one of these trucks or railroad cars or having the bridge dislodged and it falling into the Mississippi River or a barge accident being in the Mississippi River. When I imagine a terrible earthquake compounded by a nuclear waste spill all happening at the same time in this region, it's more than I can bear, and if these cartridges have to be -- if it's -- in the end, if it's agreed they have to be transported across the country, I think you should take a closer look at routing all of this through the New Madrid fault area, this part of the country.

### **Response**

The transportation regulations of the Nuclear Regulatory Commission include shipping cask design requirements for normal and accident conditions of transport (10 CFR Part 71). The regulations do not specifically address natural disasters such as earthquakes, floods, or tornadoes. However, if a shipment to Yucca Mountain were to be involved in any of these natural disasters, the impact on the cask would be within the bounds of the hypothetical accident defined in 10 CFR Part 71. The shipping casks used to transport these materials are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even

when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents.

In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway routes or rail lines could be used. In the interim, states and tribes may designate alternate preferred highway routes, and highways and rail lines could be constructed or modified. Final routing decisions would be conducted in accordance with U.S. Department of Transportation routing guidelines. The routing evaluations would consider such parameters as emergency response capabilities; local terrain, road design, and climate characteristics as they affect accident rates; economic effects of accidents; sensitive environments exposed; and locations of special facilities such as hospitals and schools (see DIRS 103718-DOT 1998, *Identification of Factors for Selecting Modes and Routes for Shipping High-Level Radioactive Waste and Spent Nuclear Fuel*). The preferred routes would be submitted to the Nuclear Regulatory Commission for approval.

#### **8.7 (5866)**

##### **Comment** - EIS001557 / 0002

That being said the [Public Utilities] Commission's [of Ohio] position can be simply stated in this matter. And that is; that if these shipments are to be made, it's our desire that these shipments be made as safely as possible for the citizens of Ohio.

##### **Response**

DOE shares the Ohio Public Utilities Commission's objective of making the shipments as safely as possible. As stated in Section 2.1.3.2 of the EIS, DOE would meet all requirements and regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission (NRC) in transporting spent nuclear fuel and high-level radioactive waste to the repository. DOE would meet these requirements and regulations in consultation with state and tribal authorities. To attain this objective, the waste would be shipped in casks certified by the NRC as meeting strict performance standards, the shipments would be escorted to minimize the possibility of terrorist attacks in accordance with NRC requirements, and the routes would be selected in accordance with applicable Department of Transportation regulations and in consultation with state, tribal, and local authorities.

In response to public comments, DOE has added Appendix M to the EIS to provide further information on topics concerning transportation of spent nuclear fuel and high-level radioactive waste to Yucca Mountain. These topics include the protocols to be used by the Regional Servicing Contractors (see Section M.3) and the training and technical support that DOE would provide under NWPA Section 180(c) (see Section M.6) and cask safety and testing (see Section M.4).

#### **8.7 (5969)**

##### **Comment** - EIS001879 / 0004

The Draft EIS does not take cognizance of several Nye County Commission resolutions regarding the transportation of nuclear waste in Nye County. The resolutions state that it is unacceptable to ship highly radioactive wastes on Nye County's Main Street (US-95, between Tonopah and Mercury), or on Nevada Highway-160, the Main Street of the site county's largest and most rapidly growing community, and its link to the state's metropolitan center. Commission resolutions also state that shipment of high-level wastes should be by rail (cross country and in Nevada), and that the preferred rail route is one that avoids site county communities to the greatest possible extent.

The Draft EIS examines the shipment of highly radioactive wastes on 220-foot long heavy-haul tractor trailers, moving at average speeds of 20 miles per hour (or less) on two-lane rural public highways directly through Nye County communities. Resolutions by the Nye County Commission have made it clear that such shipment is unacceptable in Nye County.

Nye County Commission resolutions constitute local government plans, and should be recognized and treated as such in the analysis, identification, and evaluation of human health, environmental, and socioeconomic impacts.

**Response**

DOE believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date, a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), DOE would identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that DOE selected heavy-haul truck as its mode of transportation in Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

Although some counties, towns, and cities have ordinances in place prohibiting the transportation of high-level nuclear waste, these ordinances, in order to be officially recognized by the Federal Highway Administration (FHA) a person, State, or political subdivision thereof, or Native American Tribe directly affected by a highway routing designation, must submit an application for preemption determination to the Administrator of the FHA, to determine if the route designation can be preempted as defined by 49 U.S.C. 5125 and 49 CFR Part 397, Subpart E. After review of the application, the FHA Administrator may grant a waiver of preemption, if the preemption standards of 49 CFR 397.203 are met. Highway routing designation includes any regulation, limitation, curfew, time of travel, restriction, lane restriction, routing ban, port-of-entry designation, or route weight restriction applicable to the highway transportation of hazardous materials (including class 7 radioactive waste) over a specific highway route or portion of a route.

DOE would adhere to all applicable ordinances that have been granted a waiver of preemption by the Administrator of the Federal Highway Administration when transporting high-level nuclear waste or spent nuclear fuel.

**8.7 (6206)**

**Comment** - EIS001291 / 0003

The Public Utilities Commission of Ohio requires every motor carrier of radioactive and hazardous materials to register with and obtain a Uniform Permit from the Commission.(iv) This program helps to ensure that every carrier meets basic, minimum safety requirements before transporting radioactive or other hazardous materials in this state.

In addition, the Commission employs rail inspectors who are certified by the Federal Rail Administration in specialties affecting rail safety, such as equipment, track, operating practices and hazardous materials. Under an agreement between the Commission and the FRA [Federal Rail Administration], the Commission rail inspectors will conduct inspections of rail track and equipment and forward any violations on the FRA for enforcement action.

The Commission has been designated by the Governor as the state routing agency for the highway transportation of radioactive materials and other hazardous materials, but we cannot prevent the transportation of these radioactive materials through this state. Any such effort would be viewed as interfering with interstate commerce and would be clearly unconstitutional. However, if the materials are shipped by highway, the Commission does have the authority

to require that such transportation take place on routes which minimize the potential radiological risk to the public and the environment.

Please note that the Commission's authority under Federal law is limited to highway routing of radioactive materials; the Commission has no authority to designate routes for shipment by rail. If the Department of Energy chooses to move these shipments by rail, the Department will bear sole responsibility for selecting which rail lines will be used to transport these shipments. However, the Commission will use its knowledge of the rail lines in the State of Ohio to work with the Department of Energy to select the most appropriate rail lines for these shipments. Moreover, the Commission staff will conduct inspections to monitor the safety of the track, equipment and the radioactive materials.

Federal regulations require that certain "highway route controlled quantities" of radioactive materials be transported only on "preferred routes." (v) In the event that a state has not designated an alternative route, the "preferred routes" are considered to be interstate highway system routes; bypasses and beltways, if available, are required to be used around densely populated urban areas. (vi) The state routing agency, however, can designate routes to be used in addition to, or instead of, the interstate highway system as the "preferred routes." (vii) The Commission has not designated any such "alternative routes" at this time.

However, the Commission is examining the possibility of preferred routes for these shipments of radioactive wastes. The Commission has provided a grant of \$98,000 to the Ohio State University to research the risk factors involved in routing radioactive materials on the state's highways. This research will provide the Commission with the data necessary to determine which routes would minimize potential radiological risk to the public and the environment.

Before the Commission will designate any such routes, the Commission will be guided by two principles. First, the Commission will only designate routes at the behest of, and where there is a full participation among, the local communities. The Commission strongly believes that recommendations for routing radioactive and other hazardous materials should come from the local communities affected by the transportation. The Commission should not impose routing requirements unless there is full participation among the local communities as to the proper route, and the proposed route minimizes potential radiological risk to the public and the environment.

Secondly, the Commission will not designate routes for radioactive and other hazardous materials which serve to export the risk to other communities or states. Decisions by Federal courts and agencies make it clear that routing designations which serve to export the risk to other communities are preempted by Federal law. Therefore, local communities which are potentially affected by any routing recommendation must be part of the process which proposes the routing recommendation. Likewise, any proposed routing recommendations must not serve to export the risk to our neighboring states.

At the appropriate time, when there is greater certainty as to the timing, volume and routes of the shipments, the Commission staff will be available to provide technical assistance to local communities which desire to prepare routing recommendations. Moreover, the Commission will provide grants through the Hazardous Materials Grant Program to local communities to fund the costs of the planning and study necessary for routing recommendations.

Finally, it is important to bear in mind one additional requirement under Federal law. Any radioactive materials routing designation made by the Commission on behalf of the State of Ohio may have an impact upon, and thus, under Federal law, will require the consent of, any state affected by such a designation. The shipments discussed in the Draft Environmental Impact Statement predominantly would be through shipments, shipments which neither begin in nor end in this state; therefore, any action by the Commission will require close coordination with our neighboring states of Pennsylvania, West Virginia, Kentucky, Michigan and Indiana.

(iv) Ohio Admin. Code Section 4901:2-6-14; Ohio Rev. Code Ann. Section 4905.80(B)(1).

(v) 49 C.F.R. Section 397.101(b).

(vi) 49 C.F.R. Section 397.101(b)(2).

(vii) 49 C.F.R. Section 397.103.

**Response**

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this point in time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway routes or rail lines could be used. In the interim, state or Native American tribal governments may designate alternate preferred highway routes, and highways and rail lines could be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate) that reduce time in transit. DOE identified rail lines based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials.

DOE would welcome the opportunity to work with the Public Utilities Commission of Ohio to ensure the safety of shipments of nuclear waste in and through Ohio. The Commission's knowledge of local highway and rail conditions would be especially valuable in aiding DOE's selection of routes. DOE appreciates the Commission's recognition of the role of neighboring states.

As required by the NWPA, DOE would acquire Regional Servicing Contractors to support planning and operation of the transportation system (additional details of the responsibilities and process are provided in Section M.3 of the EIS). The Department has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. This includes identification of proposed routes and associated routing considerations, coordination and communication with all participating organizations and agencies, including other Regional Servicing Contractor(s), DOE, state, Native American tribal, and local governments, and interactions with appropriate Federal and state organizations. The route and mode determinations would be interactive. If, during the course of the mode or route determinations, one of the previously determined factors changed, the site-specific mode and route analysis would be reevaluated to ensure consistency. The Regional Servicing Contractor would consult with other Regional Servicing Contractor(s) as appropriate to ensure continuity and consistency of routes and to ensure trained emergency.

**8.7 (6488)**

**Comment** - EIS001774 / 0006

Who will monitor worker and public exposure? Who will implement and evaluate quality assurance and quality control in the NRC [Nuclear Regulatory Commission], DOE and DOT [U.S. Department of Transportation]? Who will run the incident reporting system? Where is the funding for state and local inspectors enforcement? Who pays for or provides for evacuation plans, training and radiological protection equipment? If there is no Price Anderson coverage on theft or sabotage if a truck or train goes off a planned route, who pays for that?

**Response**

Nuclear Regulatory Commission and DOE regulations require monitoring of radiation workers, records of their exposures, and maintenance of those records. Regional Servicing Contractors would monitor their workers to ensure that no individual's exposure exceeded regulatory limits. The Regional Servicing contract would contain a clause in accordance with DOE Acquisition Regulation 952.223-75 that would require individual occupational radiation exposure records generated in the performance of work under the contract to be subject to inspection by DOE and preservation by the contractor until DOE authorized disposal. The Nuclear Regulatory Commission limits radiation emitted from radioactive packages to protect the public. The Regional Servicing Contractors and responsible agencies would monitor waste casks containing spent nuclear fuel or high-level radioactive waste.

Although the EIS analyses are based on the latest reasonably available information and state-of-the-art analytical tools, not all aspects of incident-free transportation or accident conditions can be known with absolute certainty. In such instances, DOE has relied on conservative assumptions that tend to overestimate impacts. For instance, DOE assumed that the radiation dose external to each vehicle carrying a cask during routine transportation would be the maximum allowed by U.S. Department of Transportation regulations. Similarly, DOE assumed that an individual, the "maximally exposed individual," would be a resident living 30 meters (100 feet) from a point where all truck shipments would pass. Under these circumstances, the maximally exposed individual would receive a dose of about 6 millirem from exposure to all truck shipments (6 millirem represents an increased probability of contracting a fatal

cancer of 3 in 1 million). Although it can be argued that individuals could live closer to these shipments, it is highly unlikely that an individual would be exposed to all shipments over the 24-year period of shipments to the repository, even though DOE incorporated this highly conservative assumption in the analysis. Given these very low exposures, DOE has no plans to monitor exposures to the public during transport.

The Nuclear Regulatory Commission has established Quality Assurance requirements that apply to the design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, and modification of waste package components such as the casks that DOE would use to transport radioactive waste to a repository (10 CFR Part 71). The requirements mandate cask designers and fabricators to have an approved Quality Assurance program. The DOE Office of Civilian Radioactive Waste Management (OCRWM) and its contractors must comply with Nuclear Regulatory Commission requirements. DOE has a Quality Assurance program applicable to all its activities and contractors. The Nuclear Regulatory Commission and DOE can audit a contractor's activities at any time to determine compliance with the requirements. The U.S. Department of Transportation does not impose specific Quality Assurance requirements.

U.S. Department of Transportation regulations require a carrier to notify the Department by telephone at the earliest practicable moment after an incident involving certain hazardous materials (49 CFR 171.15). The carrier must report the incident in writing within 30 days. The Department of Transportation keeps a record of such incidents and publishes an annual report. (The latest report is available on the Internet at <http://hazmat.dot.gov/brindex98.htm>.) In addition, DOE has a reporting system that includes reporting of unusual, off-normal, and emergency occurrences (Order 232.1A, Occurrence and Processing of Operations Information).

Section 180(c) of the NWPA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using an up-front planning grant and based on availability of funds in annual Program budgets specified by Congress. Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures for implementation of Section 180(c) of the NWPA (63 *FR* 23753, April 30, 1998) is designed to provide adequate time for training of first responders in advance of the first shipments. Should a decision to proceed with the development of a repository at Yucca Mountain be made, Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. The Department would provide an initial planning grant and a base grant for a need assessment and planning and coordination activities associated with interacting with local jurisdictions and neighboring jurisdictions. A percentage of these funds (25 percent in the first year, 10 percent thereafter) could be used for the purchase of equipment. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

With respect to compensation for losses associated with an accident involving spent nuclear fuel and high-level radioactive waste, the Price-Anderson Act (discussed in Section M.8 of the EIS) establishes a system of financial protection for persons liable for and for persons injured by a nuclear accident or incident. The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to \$9.43 billion is available to compensate for damages suffered by the public, regardless of who causes the damages. Beyond that level, Congress will consider further action that it determines is necessary to provide full and prompt compensation to the public. Price-Anderson indemnifies all persons liable for the nuclear damage including state, local, and tribal governments, emergency response workers, health care personnel, victims, and any other citizens or members of the public.

Because of the public's interest in transportation, DOE has added to this EIS Appendix M and maps and tables that show the analyzed routes and estimated health and safety impacts for each state through which the shipments would pass. Appendix M provides general background information about transportation-related topics, such as transportation regulations (Section M.2), transportation operations (Section M.3), cask testing (Section M.4), and emergency response (Section M.5).

## 8.7 (6558)

### **Comment** - EIS001328 / 0007

To assure a technically superior transportation system and to help attain public confidence in the safe transportation of nuclear waste, NCSL [National Conference of State Legislatures] urges Congress and DOE to: Apply special criteria to the shipment of spent fuel, including the development of guidelines for routing when shipping by rail, the use of special trains (unit or dedicated trains; moving at designated safe speeds) for rail shipments, safety inspections at origin and enroute, and full-scale testing of casks used for spent fuel transport.

### **Response**

In response to these and other public comments, DOE has added information on proposed transportation activities to the EIS (see Appendix M). Appendix M includes additional information on the regulations that govern spent nuclear fuel and high-level radioactive waste transportation, the proposed process that DOE would use to acquire commercial transportation services, and the expected operational details and protocols DOE would follow if the Yucca Mountain site was approved (see Sections M.2 and M.3).

DOE intends to purchase services and equipment from Regional Service Contractors who would perform waste acceptance and transportation operations. Section M.3.1.6 of the EIS provides a discussion of the protocols and procedures that would be implemented by a Regional Servicing Contractor and its subcontractors.

DOE would require its Regional Servicing Contractors to follow specific guidelines in the recommendation of rail routes. These guidelines are in the operational protocols in Section M.3 of the EIS.

DOE could decide to use a dedicated train that carries only the material to be shipped to Yucca Mountain, or could elect to move the spent nuclear fuel and high-level radioactive waste in general freight. DOE continues to evaluate the safety, cost, and schedule aspects of dedicated trains, however a decision on their use has not been made at this time. If the material was shipped as general freight, the position of the spent nuclear fuel or high-level radioactive waste car in the train is regulated by 49 CFR 174.85.

Truck shipments would be inspected in accordance with the *Commercial Vehicle Safety Alliance Enhanced North American Standard Level I Inspection Procedures and Uniform Enhanced Out-of-Service Criteria* (DIRS 102209 CVSA 1999). Rail shipments would be inspected in accordance with the rules of the Federal Railroad Administration.

The NWSA requires DOE to use casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository. The Commission's certification regulations indicate that cask testing must represent the kinds of forces that a cask would encounter in a severe transportation accident. A cask's ability to survive the tests prescribed by the regulations (10 CFR Part 71) can be demonstrated either through component analysis or through scale-model and full-scale testing to demonstrate and confirm the performance of the casks. The Nuclear Regulatory Commission would decide which level of physical testing or analysis was appropriate for each cask design submitted.

## 8.7 (6567)

### **Comment** - EIS001632 / 0055

EPA [the Environmental Protection Agency] suggests that the final EIS provide a section which lays out the responsibilities of various federal, state, local and tribal agencies in regulating, approving and monitoring shipments of nuclear waste. This information should provide additional assurance to the public that a national network of controls is in place designed to ensure public safety.

### **Response**

Because of the public's interest in transportation, DOE has added to this EIS Appendix M and maps and tables that show the analyzed routes and estimated health and safety impacts for each state through which the shipments would pass. Appendix M provides general background information about transportation-related topics, such as transportation regulations (Section M.2), transportation operations (Section M.3), cask testing (Section M.4), and emergency response (Section M.5).

DOE has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. This includes identification of proposed routes and associated routing considerations, coordination and communication with all participating organizations and agencies, including other Regional Servicing Contractor(s), DOE, state, Native American tribal, and local governments, and interactions with appropriate Federal and state organizations. The route and mode determinations would be interactive. If, during the course of the mode or route determinations, one of the previously determined factors changed, the site-specific mode and route analysis would be reevaluated to ensure consistency.

#### **8.7 (6631)**

**Comment** - EIS001160 / 0068

Page 1-8: The DEIS does not consider the potential for certain defense high-level radioactive wastes to have security requirements which limits pre-notification of emergency first responders about pending shipments. Measures to mitigate pre-notification restrictions should be addressed within the FEIS.

#### **Response**

DOE would comply with Nuclear Regulatory Commission regulations requiring notification to the governor or the governor's designee by mail or messenger [10 CFR 73.37(f)]. Governors would notify state and local safety officials, as appropriate, of the pending shipments. Tribes would receive notification if the Commission amended the regulation to allow such notice. In response to comments, additional information on the notification process is included in Section M.3.2.2.1 of the EIS.

The Nuclear Regulatory Commission regulations require notification to the governor or the governor's designee by mail or messenger [10 CFR 73.37(f)]. If the notification is by mail, it must be postmarked at least 7 days before transport of a shipment within or through the state. If the notification is delivered by messenger, it must reach the office of the governor or the governor's designee at least 4 days before transport of a shipment within or through the state. The Commission is considering amending the regulations to provide for notification of Native American tribes in addition to the governors. DOE intends to notify the tribes along the routes if the regulations are revised. In accordance with these regulations, DOE cannot notify local municipalities or other jurisdictions of upcoming shipments. The governor has the option to notify others in the state of the shipments provided the others agree to protect the schedule information.

#### **8.7 (6905)**

**Comment** - EIS001539 / 0007

Compliance with State Hazardous Materials Routing Regulations: Colorado law precludes the shipment of nuclear materials on much of I-70. The unavailability of I-70 makes Denver highways unattractive as shipping routes to Yucca Mountain.

DOE must comply with the State of Colorado's Rules and Regulations Concerning Nuclear Materials Transportation Route Designation (8CCR 1507-6). Among other requirements, these regulations preclude the shipment of nuclear materials on I-70 west of Denver, between the junction of U.S. 40 and the Colorado-Utah state line, and on I-70 east of I-25 to the junction with State Highway 2. As all shipments directed through Denver must either travel north or south before being directed west to Yucca Mountain, it will be much more effective to direct shipments to the north or south prior to entering the Denver metro area.

#### **Response**

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway route or rail lines DOE would use. In the interim, state or Native American tribal governments may designate alternate preferred highway routes, and highways and rail lines might be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate route) that reduce time in transit (see Figure 6-11). DOE identified rail lines based on current rail practices,



as there are no comparable Federal regulations applicable to the selection of rail lines for shipment of radioactive materials (see Figure 6-12).

DOE recognizes that Colorado has designated preferred routes through the state for radioactive materials in accordance with these regulations. In response to public comments, DOE has included maps of the representative highway routes and rail lines for the 45 states it used for analysis in the EIS (see Figure J-35 for the representative Colorado routes). It also included potential health and safety impacts associated with shipments for each state through which shipments could pass. Table J-75 lists the estimated number of legal-weight truck shipments of spent nuclear fuel and high-level radioactive waste that would either originate or pass through Colorado. The table also lists the estimated number of rail shipment through Colorado in the mostly rail scenario for each of the Nevada rail corridors and heavy-haul truck routes.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

#### **8.7 (6971)**

##### **Comment** - EIS001545 / 0001

But I guess a question that I have is that we have been transporting nuclear waste up to now? Correct? And we are still having hearings, yet we are still doing this. And to me, having these hearings, although they are probably beneficial in some respects, if you 're doing it already, I think we are in harm's way.

I guess I would feel that the idea of having hearings and input from the citizens should be – should come before any transportation of any nuclear waste occurs. I think we're sort of putting the cart before the horse. I don't really have anything other to say than that.

##### **Response**

In Section 2.1.2 of the EIS, the Department assumes that, for this EIS, receipt and emplacement of waste materials would begin in 2010. No material coming to the repository is expected to be shipped prior to that time so there should be opportunities for public involvement during the route selection and approval process. Almost 3000 shipments of spent nuclear fuel have been made safely in the United States over the past 30 years by many different organizations. Most of these shipments were not part of a significant Federal action requiring an Environmental Impact Statement, and, therefore, no hearings were required.

The hearings that were held on the Draft EIS for Yucca Mountain gave the public an opportunity to comment many years before the shipments are scheduled to begin. DOE has considered all comments received on the Draft EIS since August 13, 1999, as well as all comments received on the Supplement to the Draft EIS through October 19, 2001 in its development of this Final EIS. In response to comments, DOE has modified the EIS in a variety of ways, including clarifications or changes to the text, new or more recent information (such as 2000 Census data and population projections), and modified analyses (such as those for transportation impacts in which it modified the characteristics of the representative commercial spent nuclear fuel and accident source terms).

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The Department has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. This includes identification of proposed routes and associated routing considerations, coordination and communication with all participating organizations and agencies, including other Regional Servicing Contractor(s), DOE, state, Native American tribal, and local governments, and interactions with appropriate Federal and state organizations. The route and mode determinations would be interactive. If, during the course of the mode or route determinations, one of the previously determined factors changed, the site-specific mode and route analysis would be reevaluated to ensure consistency.

#### **8.7 (7014)**

##### **Comment** - EIS001600 / 0001

To give a little background, or to get the arms around the question of what I was about to address, I bothered to state a dilemma in the past in the industry. That was when we were ocean bearing nuclear waste. Brookhaven National

Laboratory loaded a barge to be unloaded outside the appropriate boundaries of the United States in water. After it was launched, the law was changed.

Considerations became political, emotional and certainly financial. The barge could not land on the coast of the United States. As a result we had nuclear waste wandering up and down the shoreline of the United States for some period of time. I forget. I know what the specific period of time was, but it was lengthy, at least a year.

This is the kind of thing when I hear a presentation that talks about transportation and reviewing since 1943 all of the shipments that occurred, it becomes very hard to focus on point. It is one instance as opposed to a statistical accumulation of data or miles, et cetera, versus risk, but it seems to me to be the keynote of the issue. The issue was what happens when things don't work correctly.

Not that they blow up, not that some more emotional issue becomes involved, but the issue becomes what happens if there is change in the political climate, the law, and an accident causes some change to occur in the protocol, and we have shipments coming into Yucca for a period of time when Yucca cannot accept it.

And then during the discourse I heard that the NRC [Nuclear Regulatory Commission] set up this protocol to recall waste from the facility, assuming it got incorrectly -- something happened at the Yucca Valley site, to make it less tentative to remain there, they could recall it, but I haven't heard anything that addressed the question of what happens if something goes wrong at Yucca while shipments are being shipped and commitments of shipments to be made, have to be made. Once again, a *fait accompli* is involved.

I ask, was that evaluated? Since I had asked the question once before, I had made it very specific and I was told no, that the DOE has not evaluated that. I consider it a very important administrative overview, a decision at a very high level to look at outliers and statistics, not to accumulate data and talk about 1943, look for the embarrassment that was a minor embarrassment and not a focus of the nation at the time of the Brookhaven situation, but when it translates into much further exponential amplification of shipments and the risks, that it be raised in the priorities of balance.

Meaning that we don't change the statistic and pull an outlier in to evaluate. I would urge the DOE to make such an evaluation. The response to the question was, no, we didn't.

#### **Response**

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The contractor providing transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments are conducted in a safe and efficient manner. One of the functions of this contractor would be the coordination of shipments of waste to meet the requirements of both the waste generators and the repository. Based on comments received on the Draft EIS, Appendix M was added to the EIS that summarizes transportation operations. Section M.3 provides a discussion of the protocols and procedures that would be implemented by a Regional Servicing Contractor and its subcontractors.

If, for any reason, Yucca Mountain was unable to receive shipments of waste, the shipments would be stopped, either temporarily until the problem is remedied, or permanently if the problem cannot be fixed.

The Yucca Mountain Repository provides a design and management approach that isolates wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years after the end of waste emplacement in the event of a decision to retrieve the waste to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. Because retrieval is not anticipated, DOE did not include it as part of the Proposed Action. However, the EIS evaluates retrieval as a contingency action and describes potential impacts if it were to occur (see Section 4.2).

## 8.7 (7061)

### **Comment** - EIS001337 / 0018

Lincoln County and the City [Caliente] recommended that various options for rail spur be considered within the EIS. Operational alternatives affecting transportation safety which the County and City suggested for consideration included varying maintenance schedules and standards (i.e. for roadbed, track and trains); options for coordinating train movements with Air Force overflights; train speeds; options for provision of security against sabotage or acts of terrorism; alternative locations for train maintenance and crew change facilities; the potential for and implications of allowing shared-use of the rail spur by other government agencies (i.e. Air Force) and industrial users (i.e. mining and energy); and options for ownership and operational management of the rail spur. It was recommended that each of these options should be evaluated against their contribution to risk management and regional economic benefit. The DEIS does not consider operational alternatives affecting transportation safety including varying maintenance schedules and standards (i.e. for roadbed, track and trains); options for coordinating train movements with Air Force overflights; train speeds; alternatives for provision of security against sabotage or acts of terrorism; alternative locations for train maintenance and crew change facilities; the potential for and implications of allowing shared-use of the rail spur by other government agencies (i.e. Air Force) and industrial users (i.e. mining and energy); and options for ownership and operational management of the rail spur.

### **Response**

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict accurately which highway routes or rail lines DOE could use. Nor is possible to provide the detailed plans suggested by the commenter, however, these elements could be considered in the future.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations (see Section M.3.1 of the EIS). The contractor providing transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments are conducted in a safe and efficient manner. DOE's draft Request for Proposal requires the contractors selected to provide transportation services must demonstrate that they have had successful experience transporting hazardous materials. The transportation contractor would be required to prepare a transportation plan that would include protocols to implement the multitude of requirements promulgated in U.S. Department of Transportation and Nuclear Regulatory Commission regulations, including land use and ownership, maintenance, scheduling, risk management, security, safety, and communications, and require consultations with responsible agencies (see Section M.3).

DOE could decide to use a dedicated train that carries only the material to be shipped to Yucca Mountain, or could elect to move the spent nuclear fuel and high-level radioactive waste in general freight. DOE continues to evaluate the safety, cost, and schedule aspects of dedicated trains, however a decision on their use has not been made at this time. If the material was shipped as general freight, the position of the spent nuclear fuel or high-level radioactive waste car in the train is regulated by 49 CFR 174.85.

DOE identified the potential for shared use of a branch rail line in Section 8.4.2 of the EIS as a reasonably foreseeable future action. This section states "DOE would have to consider these impacts [of shared use] in any decision it made to allow shared use of the branch rail line." If the site is approved, then decisions regarding ownership and shared use would be made. Line ownership, however, would not affect potential environmental impacts.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date, a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), DOE would identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that DOE selected heavy-haul truck as its mode of

transportation in Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

**8.7 (7176)**

**Comment** - EIS001337 / 0070

Page 2-43 Section 2.1.3.2.2, 2nd paragraph. The text here should indicate whether there will be any pre-notification of shipments given to state and local authorities and whether escorts will be used with each shipment.

**Response**

DOE would comply with Nuclear Regulatory Commission regulations requiring notification to the governor or the governor's designee by mail or messenger [10 CFR 73.37(f)]. Governors would notify state and local safety officials, as appropriate, of the pending shipments. Tribes would receive notification also if the Commission amended the regulation to allow such notice. In response to comments, additional information on the notification process is included in Section M.3.2.5 of the EIS.

DOE believes that a shipment of spent nuclear fuel or high-level radioactive waste is an unlikely target in part due to the physical security measures imposed by the Nuclear Regulatory Commission regulations. Under certain conditions, armed escorts either follow or ride in the truck cab or an escort railcar. Requirements for escorts can be found in 10 CFR 73.37. Other security measures include devices that shut down or immobilize the transport vehicle in case of a sabotage attempt. DOE monitors its spent nuclear fuel and high-level radioactive waste shipments through a satellite-based tracking system (see Section M.7 and M.3.2.1.5 of the EIS for additional information).

**8.7 (7445)**

**Comment** - EIS001969 / 0005

We agree with the DOE that a major accident involving a shipment of this material is of low probability with a level of general uncertainty, and therefore, is not quantified to be zero. Moving 70,000 metric tons of high-level nuclear waste, including 50 metric tons of weapons grade materials, from sites that are almost entirely east of the Mississippi River, over a 100 year period, almost ensures that an accident will occur, sometime, somewhere. Testing has shown that conditions exist under which shipping casks can be penetrated or ruptured (page 6-33 of the EIS). It is not clear in the draft whether a head-on truck or train collisions and train derailments will produce such conditions but it is important that the final EIS address DOE's plans to contain or control such events and their impacts.

**Response**

The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

With regard to the containment or control of accident events, DOE would rely on a number of actions including the training of public safety officials and the implementation of safeguards and security plans. Section 180(c) of the NWSA requires DOE to provide technical assistance and funds to states for training public safety officials and appropriate units of local government and tribes through whose jurisdictions DOE shipments would pass. DOE anticipates financial and technical assistance to eligible jurisdictions to begin at least 4 years before the commencement of shipments to the repository.

Concerning safeguards and security plans, DOE would comply with all requirements of 10 CFR Part 73, including preshipment planning, communications, armed escorts and tamper-indicating devices on shipping casks. Regarding shipment routes, pursuant to U.S. Department of Transportation regulations, 49 CFR 397.101 and NRC (DIRS 154766-1980), added protection would be afforded by the selection of routes which exhibit certain criteria including the likelihood of swift law enforcement response, avoidance of tactically disadvantageous locations such as long tunnels or bridges spanning heavily populated areas, and flexibility to adjust schedules to accommodate unexpected situations.

**8.7 (8404)**

**Comment** - EIS001124 / 0001

For transportation by truck are the waste package weights within the allowable range for the freeway/bridge/overpass/underpass systems of the proposed travel routes.

**Response**

Section 6.1.1 of the EIS describes the weights and permitting of all forms of transportation being considered by DOE. The gross vehicle weight of the truck, trailer, transportation cask, and waste for legal-weight trucks would be less than approximately 36 metric tons (40 tons or 80,000 pounds). This is the weight allowed by all states for routine truck transportation. Therefore, the weights of shipments of spent nuclear fuel and high-level radioactive waste would be within the allowable range.

**8.7 (8970)**

**Comment** - EIS002127 / 0012

Transportation issues: Why has DOE failed to address impact associated with the type of transportation vehicle and failed to provide assurances that taxpayers will not be burdened with increases to repair damaged by the project? Why is there no mention of the increased cost to Clark County or to any other location along the transportation route should there be an accident with radioactivity released into the environment?

**Response**

DOE could use two types of vehicles to transport spent nuclear fuel and high-level radioactive waste through Nevada to Yucca Mountain – trucks and trains. Impacts from two types of trucks were considered in the EIS. Section 6.2.3 of the EIS describes the impacts of legal-weight trucks, which would meet requirements for travel without a special weight permit. The current limit in all states is approximately 36 metric tons (40 tons or 80,000 pounds). There are thousands of comparable-weight trucks on the highways every day; DOE cannot determine how much damage to roads and bridges the relatively few shipments of spent nuclear fuel would cause. However, fees and taxes are paid by every truck that uses national or state highways. These fees and taxes are, in part, to maintain these highways.

The other type of truck is the heavy-haul truck that can have a total weight of up to 500,000 pounds. These trucks require special permits and must be operated under special requirements. DOE would pay to upgrade roads to properly handle these trucks and would support maintenance of the roads. The tracks on which trains operate are the private property of the railroads; therefore, taxpayers have no responsibility for their maintenance or repair.

In response to public comments, DOE has included a discussion on the range of potential costs of cleanup following a severe transportation accident in Appendix J of the EIS. This discussion reviews calculations of land area contaminated and costs for cleanup presented in past studies, including a report used in the 1986 Environmental Assessments (DIRS 154814-Sandquist et al. 1985), and information submitted by the State of Nevada in its comments on the Draft EIS. The information submitted by the State included estimates of cleanup costs as high as \$9.4 billion. Cost data used in the studies reviewed in Section J.1.4.2.5 included data compiled from case studies involving actual cleanup of radioactive materials contamination. The studies address consequences for releases of radioactive materials in communities.

Although the studies project high costs for cleanup following severe accidents, the accidents evaluated would be very unlikely and, as a consequence, DOE believes the economic risks of transportation accidents are very small. The shipping casks used to transport spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions

even when damaged. Furthermore, the high-level radioactive waste would be in a solid form that would not be easily dispersed (ceramics, metals, or glasses).

Numerous tests and extensive analyses, using the most advanced analytical methods available, have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

The economic costs of accidents where there was no release of radioactive material would not be expected to be substantial. The health and safety consequences of a maximum reasonably foreseeable transportation accident are discussed in Section 6.2.4.2 of the EIS. The EIS analysis did not include the restorative effects of postaccident recovery, remediation, or cleanup in estimating the health and safety impacts, and would therefore tend to overestimate, rather than underestimate, actual radiological impacts.

The Price-Anderson Act establishes a system of financial protection (compensation for personal injury and property damage, including loss of use of property) for the public in a nuclear accident, regardless of who causes the damage. See Section M.8 of the EIS for a discussion of the Price-Anderson Act. The Price-Anderson Act would indemnify any person held liable for damage including cleanup of released radioactive materials. Persons indemnified would include DOE contractors, subcontractors, suppliers, state, local or tribal governments, emergency response workers, health care workers, other workers, victims and other citizens who might be held liable.

## **8.7 (9033)**

### **Comment** - EIS001290 / 0003

The League of Women Voters of Ohio has adopted the position that hazardous materials should be handled in a responsible manner, in the following order of priority:

- a. strict enforcement of container regulation;
- b. mandatory reporting to state and local authorities of spills of reportable quantities, including those involving intra-state carriers;
- c. strict enforcement of placarding, labeling, and documenting requirements;
- d. permits for trucking companies carrying hazardous materials with ability to suspend or revoke such permits;
- e. routing requirements for certain selected extremely hazardous materials, including:
  - 1) the specification and/or the disapproval of some routes for some shipments,
  - 2) requirements for an escort for some shipments, and
  - 3) prenotification for some shipments
- f. state regulated training for drivers and loaders;
- g. collection, coordination, and analysis of data.

### **Response**

Transportation of hazardous materials in the United States is a very highly regulated activity, and transportation to a repository would be conducted under the umbrella of these regulations with oversight, as applicable, of various local, tribal, state, and Federal agencies. This would ensure that all shipments would be made safely (see Section M.2 of the EIS). Section 2.1.3.2 states that DOE would comply with all applicable regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission, as well as applicable state and local regulations.

Because of the public's interest in transportation in general, the Department has included a new Appendix M in this EIS. Appendix M provides general background information about transportation-related topics, such as transportation operations, cask testing requirements, and emergency response.

All of the items in the comment will be considered in the design of the transportation system. Specifically,

- The NWPA requires that DOE use casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository. The Commission certifies that a cask meets the requirements of 10 CFR Part 71, which prescribes radiological performance standards for test conditions that represent the kinds of forces that a cask would encounter in a severe transportation accident (see Section M.4).
- DOE would comply with all Federal and applicable state, local, and tribal reporting requirements for incidents involving shipments of nuclear waste (see Section M.2).
- All U.S. Department of Transportation (49 CFR Part 172) and Nuclear Regulatory Commission requirements (10 CFR Part 71) for placarding, labeling, and documentation would be followed (see Section M.2.2).
- At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. Section M.3 contains more information on the operational procedures and protocols DOE would use if the Yucca Mountain site received approval. Section M.3.1 contains more detail on the proposed role of the Regional Servicing Contractor.
- U.S. Department of Transportation routing regulations (49 CFR Part 397), which require all of the items in the comment, would be followed by DOE with approval of routes by the Nuclear Regulatory Commission. DOE would comply with physical security regulation promulgated by the Commission in 10 CFR Part 73 (see Sections M.3.2.1.2 and M.7).
- Drivers and other crew would be trained in accordance with Federal requirements (49 CFR Part 172) (see Section M.2.2.6). However, it would not be possible to allow state regulation because of the interstate nature of the shipments.
- Data on all shipments would be collected and analyzed so that the experience could be used to improve shipping practices.

#### **8.7 (9598)**

**Comment** - EIS001888 / 0272

Waste Form and Waste Acceptance

There is no discussion of waste acceptance procedures and waste form and acceptance at the generator site. In previous discussions, the DOE made waste acceptance one of its critical system components, yet the DEIS does not address either the risks of generator-site waste handling or the procedures necessary to transfer waste from the DOE or generator to the waste carrier. Experience with DOE has made decontamination and decommissioning contractors wary of the DOE. It is likely that companies contracted to handle and manage the waste at the generator sites will be reluctant to do so without specific guarantees and careful compliance standards. Important questions are not addressed: Who is responsible for ensuring the waste is in the proper form? How will the waste be transferred to the RSC carrier for shipping? What are the handling procedures? Will there be similar handling procedures at each intermodal site? Are handling procedures going to be standardized? When? There are numerous important concerns with waste handling, none of them are addressed by the DEIS. The DEIS must address the issue of waste acceptance and waste form both at the generating site and at the acceptance site.

#### **Response**

Section 6.2.2 of the EIS addresses potential impacts from loading spent nuclear fuel and high-level radioactive waste in transportation casks and on to transportation vehicles at the 72 commercial and 5 DOE sites. Chapter 4 addresses impacts from unloading operations at the repository. Preparation of spent nuclear fuel at commercial sites is controlled by provisions of the Standard Contract that DOE has with each generator.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations (see Section M.3.1 of the EIS). The contractor providing

transportation services would be required to prepare a transportation plan that would discuss the various steps it would take to ensure the shipments are conducted in a safe and efficient manner. The specific processes and protocols for accepting and transferring the spent nuclear fuel to transportation vehicles are the responsibility of the Regional Servicing Contractor. The contractor would develop specific conditions, schedules, and operations with generators and other responsible agencies prior to any shipping activities. These plans would be reviewed and approved by DOE. Similar and compatible processes and protocols would be specified for intermodal operations, if required, and at the repository acceptance facility.

#### **8.7 (9770)**

**Comment** - EIS001888 / 0356

[Clark County summary of comments it has received from the public.]

Commenters requested that the EIS justify the selection of the alternatives, and that the alternatives and options be sufficiently defined to comprehensively describe the affected environment, and to allow an equivalent analysis (between alternatives) of potential positive and negative impacts to human health and the environment (e.g., groundwater, air, socioeconomics) from routine operations and accidents during construction, operation, and closure. The types of detail identified include: (11) agency responsibilities for transportation and accident/emergency response.

#### **Response**

Section J.3 of the EIS describes the selection criteria for identifying route and modes for implementing alternatives for Nevada transportation. The various references in this section provide the data and information for making the selections. Specific references include:

- DIRS 104737-YMP 1997, *Location of Alternate Heavy-Haul Routes and Future Las Vegas Beltway*
- DIRS 104743-YMP 1998, *Nevada Routes for Legal-Weight Truck Shipments of SNF and HLW to Yucca Mountain*
- DIRS 104560-YMP 1998, *Potential Rail Alignments*
- DIRS 103718-DOT 1998, *Final Report, Identification of Factors for Selecting Modes and Routes for Shipping High-Level Radioactive Waste and Spent Nuclear Fuel*

Several other references of Section J.3 of the EIS describe engineering characteristics and environmental characteristics of alternative routes. Selected implementing alternatives are described in detail in Section J.3 for heavy-haul truck and rail implementing alternatives (those alternatives that would require new or modified corridors or alignments. Each candidate route is described by a dozen pertinent environmental characteristics including ground water, air, and socioeconomic impacts.

The U.S. Department of Transportation and the Nuclear Regulatory Commission share responsibilities for the regulation of the transportation of spent nuclear fuel and high-level radioactive waste. The shipper and the carrier have the responsibility to obey the regulations of the Department of Transportation and the Nuclear Regulatory Commission, including safety and physical security. The regulations governing transportation of radioactive materials implemented by these agencies are consistent with international transport safety standards.

The Hazardous Materials Transportation Act of 1975, as amended in 1994, directed the U.S. Department of Transportation to develop transportation safety standards for hazardous materials, including radioactive materials (see Title 49 of the Code of Federal Regulations). These regulations set the standards for packaging, transporting, and handling radioactive materials for all modes of transportation. Standards for labeling, shipping papers, placarding, loading, and unloading, allowable radiation levels, and limits for contamination of packages and vehicles, among other requirements, are included in the regulations. The regulations specify training needed for personnel who perform handling and transport of hazardous materials, liability insurance requirements for carriers, and safety requirements for vehicles and transport operations.



The Nuclear Regulatory Commission regulates the packaging and transportation related operations of its licensees, including commercial shippers of radioactive materials. It sets design and performance standards for packagings (shipping casks) that carry materials with higher levels of radioactivity. In addition, The Commission establishes safeguards and security regulations to minimize the possibility of theft, diversion, or attack on shipments of spent nuclear fuel and special nuclear materials. These requirements are detailed in Title 10 of the Code of Federal Regulations. As required by the NWSA [Section 180(c)], all shipments to Yucca Mountain would be made in Nuclear Regulatory Commission-certified packages and in accordance with Commission regulations regarding advanced notification of state governments.

The primary responsibility for emergency response lies with the local law enforcement agency of the jurisdiction in which the emergency occurs (see additional information on emergency response in Section M.5 of the EIS). DOE and its Regional Servicing Contractors would be available to provide assistance and technical information about the shipment (see additional information on procedures and protocols in Section M.3). DOE would have furnished technical and financial assistance in accordance with Section 180(c) of the NWSA for the training of public safety officials in procedures for safe routine transportation and for emergency response procedures (see additional information in Section M.6).

#### **8.7 (9902)**

##### **Comment** - EIS001888 / 0448

[Clark County summary of comments it has received from the public.]

Internet and hard copy annual reports to include identification of carriers, sources & destinations of each shipment, number and volume of shipments for, each substance, routes, incident/accidents and mitigative actions, evaluation of each ship shipment.

##### **Response**

As described in Section M.3.2.1.6 of the EIS, DOE Regional Servicing Contractors would provide reports with detailed information on each shipment. The information in the reports would be available to the public in a timely manner. The exact form and content of such reports have not been determined.

#### **8.7 (10448)**

##### **Comment** - EIS001567 / 0001

As you've heard tonight in the presentation, there are still a lot of questions; technical, legal, and political questions that have to be resolved and at this point in time it's not even a certainty that these movements will actually take place. The Commission's position on this is very simple. The Commission's believes that if these shipments are to be made at all, then it is critical that these shipments be made in the very safest manner possible to protect the citizens of Ohio.

Given the uncertain state of affairs, it's very difficult to get into a lot of detail and respond in detail. But there are a few general points that I think needs to be made. First of all the Commission is going to have three primary responsibilities with respect to this activity. The first of these is that we're going to be responsible for ensuring that these shipments are made in compliance with all the existing federal motor carrier safety regulations for motor carriers, the railroad safety regulations and also the hazardous material safety regulations that cover both modes of transportation.

As the agency that is responsible for supervising both of those modes of transportation that would be foreseeably used in this activity, we have experienced personnel and we have an active program that is involved in inspecting at roadside locations, track locations and other facilities of these carriers.

The second major component of our work is that we must ensure that the routes that are going to be used minimize the potential risk to the public and the environment. And we have begun on that task already. We, this fall, presented a grant to the Ohio State University to begin preliminary work as to how to attack the problem, how to analyze these possible routes, the factors to be looked at and other public policy considerations that should go into that. We intend to, eventually at the appropriate time, involve the local communities in this process. And, I would just comment in that regard as far as the routing itself, that the Commission is going to follow two principles in carrying out it's responsibilities.

The first is that we will insist on an involvement of all the local communities that are involved in a routing decision and we will not leave a community out in helping us to arrive at that decision. The kind of the flip side of that is, we will also not permit a route to be established merely to export the risk into a neighboring community and we will insist that whatever routes are finally designed, are those that minimize the total risk and exposure in the movement.

The final component of this is the fact that we intend to work with the local communities on emergency response. We have funding programs to help local communities to train their emergency responders. We work with the Cleveland State University in [its] HAZMAT [hazardous materials] program and we will continue to fund these efforts and ensure that all local communities have the necessary training for their response efforts.

The final point that I would make is, that it is our intention and our expectation that the DOE will not only provide adequate funding to assist us in this effort, but they will also complete their work and give us sufficient time to put that training in place and to ensure that these movements are made in a safe manner.

### **Response**

DOE agrees with the objectives of the Ohio Public Utilities Commission and looks forward to the Commission's cooperation in assuring the safety of spent nuclear fuel and high-level radioactive waste shipments through Ohio. Based on the results of the impact analyses presented in Chapter 6 and Appendix J of the EIS, as well as the results published in numerous other studies and environmental impact analyses cited in the EIS, DOE is confident that spent nuclear fuel and high-level radioactive waste can be and would be safely transported to Yucca Mountain. DOE believes, as the EIS reports that the potential impacts of this transportation would be so low for individuals who live and work along the routes that these individual impacts would not be discernible even if the corresponding doses could be measured.

In Section 2.1.3.2 of the EIS, DOE states that the transportation of spent nuclear fuel and high-level radioactive waste to the proposed repository at Yucca Mountain would comply with applicable regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission, as well as applicable state and local regulations. Strict compliance with all applicable safety regulations is a fundamental element in ensuring the safety of the shipments. DOE would cooperate with the Commission in the enforcement of these regulations.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began. DOE would select highway routes in accordance with U.S. Department of Transportation regulations in 10 CFR 397.101. If the State of Ohio has designated alternate routes in accordance with 10 CFR 397.103, DOE would include these alternate routes in the selection process.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The Department has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. This includes identification of proposed routes and associated routing considerations, coordination and communication with all participating organizations and agencies, including other Regional Servicing Contractor(s), DOE, state, tribal, and local governments, and interactions with appropriate Federal and state organizations (see Section M.3 of the EIS). The route and mode determinations would be interactive. If, during the course of the mode or route determinations, one of the previously determined factors changed, the site-specific mode and route analysis would be reevaluated to ensure consistency.

Section 180(c) of the NWPB requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using an up-front planning grant and based on availability of funds in annual Program budgets specified by Congress. The schedule in the proposed policy and procedures (63 *FR* 23753, April 30, 1998) for implementation of Section 180(c) of the NWPB is designed to provide adequate time for training of first responders in advance of the first shipments. Should a decision to proceed with the development of a repository at Yucca Mountain be made,

Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

#### **8.7 (10904)**

##### **Comment** - EIS000357 / 0023

What are the impacts of this increase of traffic on the tourism trade? Particularly, when would shipments be made? Would there be an effort for shipments to occur during low-season traffic times? Has the changing demographics of Snow Birds been taken into account? What are the attitudes of Snow Birds to this additional traffic? Would shipments be scheduled during low-traffic or high-traffic hours? Being moved at night or during the day?

##### **Response**

See Table J-1 of the EIS for estimated numbers of shipments for the various inventory and national transportation analysis combinations. In response to public comments, DOE has included maps of the representative highway routes and rail lines for the 45 states it used for analysis in the EIS (see Section J.4). Section J.4 includes potential health and safety impacts associated with shipments for each state through which shipments could pass. For the Proposed Action, the estimated number of truck shipments under the mostly legal-weight scenario would be 52,786, with 300 rail shipments, and under the mostly rail scenario there would be an estimated 9,646 rail shipments plus 1,079 legal-weight truck shipments. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

In response to these and other public comments, DOE has added information on proposed transportation activities to the EIS (see Appendix M). Appendix M includes additional information on the regulations that govern spent nuclear fuel and high-level radioactive waste transportation, the proposed process that DOE would use to acquire commercial transportation services, and the expected operational details and protocols DOE would follow if the Yucca Mountain site was approved (see Sections M.2 and M.3).

In light of the comments received on the Draft EIS concerning perceived risk, DOE examined relevant studies and literature on perceived risk and stigmatization of communities to determine whether the state-of-the-science in predicting future behavior based on perceptions had advanced sufficiently since scoping to allow DOE to quantify the impact of public risk perception on economic development or property values in potentially affected communities (see Section 2.5.4 and Appendix N of the EIS). Of particular interest were those scientific and social studies carried out in the past few years that directly relate to either Yucca Mountain or to DOE actions such as the transportation of foreign research reactor spent nuclear fuel. In addition, DOE reevaluated the conclusions of previous literature reviews such as those conducted by the Nuclear Waste Technical Review Board and the State of Nevada, among others. DOE has concluded that:

- While in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be predicted with any degree of certainty
- Much of the uncertainty is irreducible, and
- Based on a qualitative analysis, adverse impacts from perceptions of risk would be unlikely or relatively small.

While stigmatization of southern Nevada can be envisioned under some scenarios, it is not inevitable or numerically predictable. Any such stigmatization would likely be an aftereffect of unpredictable future events, such as accidents, which would not be expected to occur. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from risk perceptions or stigma in this Final EIS.

#### **8.7 (11192)**

##### **Comment** - EIS001557 / 0003

The second item that we are going to be focusing on is the routes that are going to be used to make sure that those are the safest possible routes that minimize the potential risk to the public. That is, as a part of our role as the designated routing agency for the State of Ohio that would be involved with the local communities and to ensure that all voices are heard and all concerns are considered in this area in the fine tuning of how these shipments will be made.

We've taken some first initial step in that regard to start gathering the data and gathering the processes to logically follow in that area. This fall the [Public Utility] Commission [of Ohio] granted a -- issued a grant, I should say, to the Ohio State University to begin this process of examining potential routes and examining issues that need to be considered in making a proper evaluation. And at the appropriate time that can be used to involve the local communities and the local emergency planners.

**Response**

DOE supports the process being followed by the Ohio Public Utility Commission to evaluate potential routes for the shipment of nuclear waste. Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict accurately which highway routes or rail lines DOE could use. Before such shipments began, state governments could designate alternate preferred highway shipping routes, and highways and rail lines could be built or modified.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The Department has issued a draft Request for Proposals requiring the Regional Servicing Contractor to prepare a transportation plan that describes the Contractor's operational strategy and delineates the steps it would implement to ensure compliance with all regulatory and other DOE requirements. This includes identification of proposed routes and associated routing considerations, coordination and communication with all participating organizations and agencies, including other Regional Servicing Contractor(s), DOE, state, tribal, and local governments, and interactions with appropriate Federal and state organizations (see Section M.3.2.1.2 of the EIS). The route and mode determinations would be interactive. If, during the course of the mode or route determinations, one of the previously determined factors changed, the site-specific mode and route analysis would be reevaluated to ensure consistency.

**8.7 (11504)**

**Comment** - EIS002137 / 0005

DOE needs to address impact mitigation, environmental, socioeconomic, transportation. Transportation. We all know about transportation in all of our communities. Anybody that's looked at a Nevada map knows all the mountain ranges run north and south. There aren't a hell of a lot of routes left. This is where we're at. I think the DOE, the people involved ought to provide more moneys to the rural counties for oversight and impact studies.

**Response**

Section 6.3 of the EIS addresses transportation impacts in Nevada for the proposed action and. Section J.3 provides additional information on methods and data used. Section 9.3 lists potential management actions that could be implemented to mitigate transportation impacts.

DOE believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date, a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), DOE would identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that DOE selected heavy-haul truck as its mode of transportation in Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

## 8.7 (11909)

### **Comment** - EIS000996 / 0004

If after this testimony and in due process of consideration, the Department of Energy decides to go ahead with the relocation process, my recommendation is to consider the safety issues associated with the transportation of radioactive materials. Create a road safety department, which evaluates and approves each shipment timetable and safety associated with road conditions, weather conditions, accounting for traffic congestion and vacation travel. Further, consideration should be made for the safest movement through the least populated areas.

However, wherever shipments going from point A to point B, they are more likely to fall within the Mississippi River drainage system and will most definitely affect billions of lives at some level of our living continuation.

### **Response**

Although there are no plans to create a road safety department, all of the factors listed by the commenter will be considered and evaluated by DOE in planning for shipments to the proposed repository. At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. The Regional Servicing Contractor would be required to provide detailed written procedures for how it would respond to an incident and arrange for repair/replacement of equipment or recovery, as appropriate. In accordance with ANSI N14-27 (DIRS 156289-ANSI 1987), the carrier is expected to provide appropriate resources for dealing with the consequences of an accident, isolating and cleaning up contamination, and maintaining working contact with the responsible governmental authority until the latter has declared the incident to be satisfactorily resolved and closed. Section M.3 of the EIS contains more detail on the proposed role of the Regional Servicing Contractor.

The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

## 8.7 (11977)

### **Comment** - EIS001923 / 0005

Maybe if the insurance liabilities limits were removed and the power companies forced to carry insurance that would cover an accident like I projected, the power companies and the Congress people in support of this project wouldn't be so positive. We have seen how well in the past oil tankers have been operated to protect the environment. There is absolutely no assurance from this poorly written DEIS that the DOE can plausibly show how a terrorist attack using state of the art weapons will not cause a major disaster in an area like the Inland Empire.

### **Response**

Although DOE anticipates accidents would occur in transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain, it does not anticipate that an accident would lead to a release of radioactive materials from a shipping cask. Nonetheless, the Price-Anderson Act provides for indemnification of liability up to \$9.43 billion to cover claims that might arise from an accident in which radioactive materials were released or one in which an authorized precautionary evacuation was made (see Section M.8 of the EIS for a more complete discussion of the Price-Anderson Act). If the damage from a nuclear incident appears likely to exceed that amount, the Price-Anderson Act contains a congressional commitment to thoroughly review the particular incident and take whatever action is determined necessary to provide full and prompt compensation to the public.

For the Final EIS, DOE reexamined, for both rail and truck casks, the consequences of an attack that results in a release of material (in other words, the cask's shield wall is penetrated)(see Section 6.2.4.2.3 of the EIS), and estimated consequences exceeded those presented in the Draft EIS. Differences in the consequences between the Draft EIS and the Final EIS are due to using "representative" spent nuclear fuel isotopics (verses "typical" in the Draft EIS) and an escalation of impacts to represent population growth to 2035. In addition, in the Draft EIS, the consequences of the sabotage event were bounded by those of the maximum reasonably foreseeable accident. However, the Final EIS analyses estimated that a sabotage event could cause 48 latent cancer fatalities if a legal-weight truck cask was penetrated and 9 latent cancer fatalities for a rail cask. DOE believes that a shipment of spent nuclear fuel or high-level radioactive waste is an unlikely target in part due to the physical security measures imposed by the Nuclear Regulatory Commission regulations. Under certain conditions, armed escorts either follow or ride in the truck cab or an escort railcar. DOE monitors its spent nuclear fuel and high-level radioactive waste shipments through a satellite-based tracking system.

## 8.7 (12137)

### **Comment** - EIS001887 / 0439

The EIS did not assess the costs of severe accidents when assessing the transportation costs involved in the Yucca Mountain Project. In order to aid in the adequate preparation for potential accidents, an estimate of the true cost of remedying such an accident is essential. This assessment must include, but is not limited to, the following: emergency costs, surface cleanup costs, decontamination costs (of roadways, buildings, groundwater, surface water, etc.), hospital costs to injured parties, lost workdays due to building contamination, economic losses due to fear of contamination, loss of tourism (e.g., in the event of an accident in Las Vegas), evacuation costs, relocation costs, contaminated food embargo costs, insurance costs, legal costs, governmental costs, and so forth.

### **Response**

In response to public comments, DOE has included a discussion on the range of potential costs of cleanup following a severe transportation accident in Appendix J of the EIS. This discussion reviews calculations of land area contaminated and costs for cleanup presented in past studies, including a report used in the 1986 Environmental Assessments (DIRS 154814-Sandquist et al. 1985), and information submitted by the State of Nevada in its comments on the Draft EIS. The information submitted by the State included estimates of cleanup costs as high as \$9.4 billion. Cost data used in the studies, reviewed in Section J.1.4.2.5, included data compiled from case studies involving actual cleanup of radioactive materials contamination. The studies address consequences for releases of radioactive materials in communities.

Although the studies project high costs for cleanup following severe accidents, the accidents evaluated would be very unlikely and, as a consequence, DOE believes the economic risks of transportation accidents are very small. The shipping casks used to transport spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Furthermore, the high-level radioactive waste would be in a solid form that would not be easily dispersed (ceramics, metals, or glasses).

Numerous tests and extensive analyses, using the most advanced analytical methods available, have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

The economic costs of accidents where there was no release of radioactive material would not be expected to be substantial. The health and safety consequences of a maximum reasonably foreseeable transportation accident are discussed in Section 6.2.4.2 of the EIS. The EIS analysis did not include the restorative effects of postaccident

recovery, remediation, or cleanup in estimating the health and safety impacts, and would therefore tend to overestimate, rather than underestimate, actual radiological impacts.

In light of the comments received on the Draft EIS concerning perceived risk, DOE examined relevant studies and literature on perceived risk and stigmatization of communities to determine whether the state-of-the-science in predicting future behavior based on perceptions had advanced sufficiently since scoping to allow DOE to quantify the impact of public risk perception on economic development or property values in potentially affected communities (see Section 2.5.4 and Appendix N of the EIS). Of particular interest were those scientific and social studies carried out in the past few years that directly relate to either Yucca Mountain or to DOE actions such as the transportation of foreign research reactor spent nuclear fuel. In addition, DOE reevaluated the conclusions of previous literature reviews such as those conducted by the Nuclear Waste Technical Review Board and the State of Nevada, among others. DOE has concluded that:

- While in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be predicted with any degree of certainty
- Much of the uncertainty is irreducible, and
- Based on a qualitative analysis, adverse impacts from perceptions of risk would be unlikely or relatively small.

While stigmatization of southern Nevada can be envisioned under some scenarios, it is not inevitable or numerically predictable. Any such stigmatization would likely be an aftereffect of unpredictable future events, such as accidents, which would not be expected to occur. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from risk perceptions or stigma in this Final EIS.

#### **8.7 (12185)**

##### **Comment** - EIS000707 / 0002

The truck transportation route involves a number of different states.

These trucks will be parked overnight at some motel, what provisions are being made to ensure that no one will be able to tamper with the trailers carrying the nuclear waste? Who is responsible for the cost of upgrades for these highways? Who will incur the cost of damage done to roads and bridges?

##### **Response**

Regulations of the Nuclear Regulatory Commission [10 CFR 73.37 (b)] require a physical protection system that, among other things, must provide at least one escort with visual surveillance of the shipment when the vehicle is stopped. In addition, shipment planning must avoid scheduled intermediate stops to the extent practicable. The trucks would have sleeper berths, so overnight parking at motels would not be necessary. In addition, any time a truck stopped for any reason, it would be under continuous visual surveillance.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. DOE would ensure that its contractors providing transportation services for the repository abide by all applicable regulations at the time of transport. The transportation contractor would be required to prepare a transportation plan that would include proposed routes and other information such as safe, en route emergency parking areas and other planned stops. DOE would make the plan available to states and tribes for comment before the shipments take place. The carrier would be able to communicate to its dispatch center and others through various means of communication, including the satellite-based tracking system. This would enable the carrier to communicate problems even in remote areas (see Section M.3).

With the exception of the heavy-haul truck scenario, the shipments would use vehicles (trucks, railcars, and barges) similar in weight, size, and operation to vehicles that transport other commodities. As a result, potential impacts on transportation infrastructure (infrastructure typically includes bridges, roadways, railroad track, switchyards, locks, navigation aids, etc.) of a vehicle used in transporting spent nuclear fuel and high-level radioactive waste across the United States would be similar to the impacts of other commercial vehicles that use the nation's transportation systems. Because there would be few vehicles transporting spent nuclear fuel and high-level radioactive waste in

comparison to other vehicles using the transportation system, the impacts on transportation infrastructure of shipments to Yucca Mountain would not be discernible. In addition, because the annual number of shipments that would be made to Yucca Mountain is less than 0.001 percent of the more than 300 million annual shipments of hazardous materials in the United States, impacts on state, local, and Native American tribal law enforcement and emergency response resources would be small.

As discussed in Section 6.3.3 of the EIS, heavy-haul truck transport in Nevada could affect transportation on roads in the State. As discussed in that section, Nevada highways along a route, including roads, bridges and culverts, would be upgraded for heavy-haul truck use, if DOE selected heavy-haul truck transport. Upgrades would include reconstruction of some highway sections, especially in areas where spring and fall thaws and freezes make highways susceptible to damage by heavy vehicles. In addition, new turnout lanes at frequent intervals along two-lane highways would be constructed to allow other traffic to pass the slower heavy-haul vehicles. The location and frequency of turnouts would be determined in consultation with State and tribal jurisdictions after a specific route was selected. Highway shoulders would be widened and road surfaces would be improved in many areas. Section 6.3.3.1 discusses impacts heavy-haul trucks would have on the flow of traffic on roads in Nevada.

#### **8.7 (12465)**

##### **Comment** - EIS000497 / 0022

In order to develop a safe and effective system for accepting commercial spent nuclear fuel and high-level radioactive waste (HLW), the federal government must expand its focus beyond siting, and develop, in coordination with the states and tribes, a logical and timely transportation program. This requires DOE policy commitments to:

- a. fix the shipping origins and destination points as early as possible;
- b. ensure the availability of rail and truck shipping casks;
- c. conduct full-scale testing of casks to be used to transport spent nuclear fuel and high-level radioactive waste;
- d. prepare a comprehensive transportation plan that includes the analysis of all needed transport-safety activities
- e. develop responsible criteria for selecting shipping routes; and
- f. develop a sound methodology for evaluating optional mixes of routes, and transportation modes.

##### **Response**

DOE agrees that detailed, comprehensive planning would be required prior to the start of shipments to a repository. The level of planning suggested by the commenter would be more appropriate once a repository site had been selected and approved.

At present, DOE intends to purchase services and equipment from Regional Servicing Contractors who would perform waste acceptance and transportation operations. Sections M.2 and M.3 of the EIS contain more information on routing regulations and operational procedures and protocols DOE would use if the Yucca Mountain site received approval. Section M.3 also contains more detail on the proposed role of the Regional Servicing Contractor. Operational protocols for transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain are presented in the Draft Request for Proposal for the *Acquisition of Waste Acceptance and Transportation Services for the Office of Civilian Radioactive Waste Management* (DIRS 153487-DOE 1998). These protocols were adopted from the *Waste Isolation Pilot Plant Transportation Safety Program Implementation Guide* (DIRS 156384-WGA 1995). The Department expects to interact with all affected stakeholders on routing and related local issues as transportation plans develop.

Should a decision to proceed with the development of a repository at Yucca Mountain be made, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. At this point in time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway routes or rail lines could be used. In the interim, state or tribal governments may designate alternate preferred highway routes, and highways and rail lines could be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified



representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highway, beltway or bypass, and state or tribal designated alternate) that reduce time in transit. DOE identified rail lines based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials.

The NWSA requires DOE to use casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository. The Commission's certification regulations indicate that cask testing must represent the kinds of forces that a cask would encounter in a severe transportation accident. A cask's ability to survive the tests prescribed by the regulations (10 CFR Part 71) can be demonstrated either through component analysis or through scale-model and full-scale testing to demonstrate and confirm the performance of the casks. The Nuclear Regulatory Commission would decide which level of physical testing or analysis was appropriate for each cask design submitted. Section M.4 of the EIS contains additional information of cask safety and testing.

DOE submitted a plan to the House Committee on Appropriation on the Energy and Water Development Act, 2001 entitled *Plan for Transportation Cask Fabrication and the Deployment of Waste Acceptance Capabilities* (DIRS 156802-DOE 2001). The plan provides, in part, the DOE strategy for the timely fabrication of transportation casks. In this report, DOE concluded that current industry performance has shown that manufacturing capacity is available to meet present and future cask fabrication needs.

DOE believes that the mostly rail scenario, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. In reaching this conclusion, DOE considered the capabilities of the sites to handle larger (rail) casks, the distances to suitable railheads, and historic experience in actual shipments of nuclear fuel, waste or other large reactor-related components. DOE also considered relevant information published by sources such as the Nuclear Energy Institute and the State of Nevada. In addition, DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

Nonetheless, in response to comments, DOE has analyzed the effects of different mixes of rail and truck shipments (see Section J.1.2.1.4 of the EIS). The results of this analysis confirm DOE's estimate that the mostly rail and mostly legal-weight truck scenarios represent a reasonable range (lower and upper bound) of potential environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

## **8.7 (12658)**

**Comment** - EIS002250 / 0004

If the nuclear energy is so safe, why did Congress place limits on liability for the nuclear industry? So, therefore, they could not be sued to a higher level for damages.

Maybe if the insurance liability limits are removed and the power companies are forced to carry insurance that would cover an accident like I projected, that power companies and Congress people support, other projects wouldn't be so positive.

We have seen how well in the past oil tankers have been operated to protect the environment. There is absolutely no assurance from this poorly written EIS that the DOE can plausibly show how a terrorist attack will not cause a major disaster in an area like the Inland Empire.

## **Response**

Although DOE anticipates accidents would occur in transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain, it does not anticipate that an accident would lead to a release of radioactive materials from a shipping cask. Nonetheless, the Price-Anderson Act provides for indemnification of liability up to \$9.43 billion to cover claims that might arise from an accident in which radioactive materials were released or one in which an authorized precautionary evacuation was made (see Section M.8 of the EIS for a more complete discussion of the Price-Anderson Act). If the damage from a nuclear incident appears likely to exceed that amount, the Price-Anderson Act contains a congressional commitment to thoroughly review the particular incident and take whatever action is determined necessary to provide full and prompt compensation to the public.

Nuclear Regulatory Commission (10 CFR Part 73) and U.S. Department of Transportation (49 CFR Part 173) regulations both include requirements to ensure the physical security and protection of shipments from diversion and attack. For the Final EIS, DOE reexamined, for both rail and truck casks, the consequences of an attack that results in a release of material (in other words, the cask's shield wall is penetrated)(see Section 6.2.4.2.3 of the EIS), and estimated consequences exceeded those presented in the Draft EIS. Differences in the consequences between the Draft EIS and the Final EIS are due to using "representative" spent nuclear fuel isotopics (verses "typical" in the Draft EIS) and an escalation of impacts to represent population growth to 2035. In addition, in the Draft EIS, the consequences of the sabotage event were bounded by those of the maximum reasonably foreseeable accident.

In the Final EIS, DOE estimated that the greatest consequences would occur if the sabotage event occurred in the center of a highly populated metropolitan area. The dose from such an event to a maximally exposed individual (about 110 rem over the person's lifetime) would increase his or her lifetime risk of a fatal cancer from about 23 percent to about 28 percent. However, doses to most affected individuals would be much lower than that to the maximally exposed individual; these individuals' increased risk of a latent fatal cancer would also be lower. It was not predicted that there would be any prompt fatalities from very high levels of exposure, and immediate health consequences from radiation exposure would be unlikely, but by combining the large number of small individual risks in the population of a metropolitan area, DOE estimated that a sabotage event could lead to as many as 48 latent fatal cancers. Although not estimated in the analysis, injuries and deaths from blast effects of a device that might be used would be expected for individuals who would be as close to the event as the hypothesized maximally exposed individual. However, exposure to radioactive materials sufficient to lead to an individual lifetime dose of 110 rem could result in a need for medical attention. DOE designed the analyses to identify the maximum consequences that a severe accident that could reasonably be expected to produce (reasonably expected is defined as a likelihood greater than, but on the order of, 1 in 10 million in a year), but the analysis here did not make extreme assumptions that would identify the worst possible consequences that could be imagined.

DOE believes that a shipment of spent nuclear fuel or high-level radioactive waste would be an unlikely target in part due to the physical security measures imposed by the Nuclear Regulatory Commission regulations. Under certain conditions, armed escorts would either follow or ride in the truck cab or an escort railcar. DOE would monitor its spent nuclear fuel and high-level radioactive waste shipments through a satellite-based tracking system. Additional information on the physical protection of spent nuclear fuel and high-level radioactive waste during transportation can be found in Section M.7 of the EIS.

## 8.8 Transportation Analyses

### 8.8 (4383)

#### **Comment** - EIS001523 / 0002

The Yucca Mountain Repository Site should not be approved since a safe method for transportation of nuclear waste materials to the site has not been determined. In the Environmental Impact Statement (EIS), the DOE has not accurately assessed the potential risk of the proposed transportation methods of either rail or highway. Several factors that must be reconsidered and reevaluated are the frequency and severity of accidents, proposed population growth in the areas near the transportation routes, and a recent increase in traffic speeds. The potential environmental impact resulting from the transportation of waste to the site have also been underestimated in this statement due to incomplete and outdated data. The DOE needs to conduct more accurate and complete studies in order to formulate a more complete assessment of the potential risks.

#### **Response**

The Nuclear Regulatory Commission has determined that the transportation of radioactive materials is safe if the shippers follow Commission and U.S. Department of Transportation requirements. The history of radioactive material transport in this country has proven this to be correct. Future shipments would occur under the same regulations that have contributed to the safe transport of more than 2,700 shipments in this country over the last 30 years. The accident analysis includes estimates of the number of accidents that could occur during shipments, estimates of the radiological risk of transportation accidents for populations along transportation routes, and a description of the consequences of maximum reasonably foreseeable transportation accidents. The maximum reasonably foreseeable accidents have an estimated frequency of occurrence of about 2.8 per 10 million years for rail shipments under the mostly rail scenario analyzed in the EIS and 2.4 per 10 million years for the mostly

legal-weight truck scenario. DOE based its estimates of accident risks and consequences of maximum reasonably foreseeable accidents on data presented in a report issued by the U.S. Nuclear Regulatory Commission (Sprung, et al., 2000). The accident analysis in the EIS addresses accidents from all sources including long duration fires, high-speed impacts, airplane crashes, and mountain rollovers. Appendix J of the EIS provides additional detailed descriptions of the analyses. The analysis used the latest reasonably available data and methods as well as cautious but realistic assumptions. For example, DOE used forecasts of population growth to estimate populations along routes. For purposes of analysis, DOE used populations forecasted to 2035 in estimating impacts. In addition, in response to public comments, DOE has added information to, and improved the clarity of transportation sections in Chapter 6 and Appendix J. The additional information includes more specific data on along-route populations as well as additional information used in analyzing potential impacts on biological resources, land use, soils, aesthetics, cultural resources, noise, ground vibration, flood plains, wetlands, air quality, environmental justice, waste management, and socioeconomics.

### **8.8 (4833)**

#### **Comment** - EIS001226 / 0007

Locally, Illinois is expected to receive the third largest number of shipments as many as 13,000 over the next 30 years, or an average of 8 per week, every week, for 30 years, all requiring costly escort services.

#### **Response**

As presented in Section J.4 of the EIS, the number of legal-weight truck shipments through Illinois used by DOE to estimate impacts is about 38,500. About 5,300 would originate in the State. Illinois presently charges a fee of \$2,500 per cask for truck shipments and a fee of \$4,500 for the first cask and \$3,000 for each additional cask for train shipments. Presumably, these fees adequately cover the costs of the current Illinois inspection and escort program. Should the repository transportation program go forward, DOE would consult with affected states on activities and fees appropriate at the time.

### **8.8 (12091)**

#### **Comment** - EIS002307 / 0005

Section 6 of the DEIS is incorrect in its analysis of transportation safety because the DEIS uses average weather conditions rather than conditions that would produce the greatest effects.

#### **Response**

The objective of the analyses in the EIS is to produce realistic yet conservative estimates of risks, not the largest possible estimates of risks as suggested by the commenter. The analysis provided in Section 6.2.4 of the EIS uses cautious assumptions and the latest reasonably available methods and data to provide conservative estimates of the potential radiological consequences of severe accidents and successful sabotage attacks on spent nuclear fuel shipments. The details of the calculations are provided in Section J.1.4.2. There could be specific locations along the transportation corridors in Nevada leading to the Yucca Mountain Repository that appear to be more vulnerable to an accidental release of radioactive material from a shipping cask. However, the computer models and data used in the accident consequence assessments result in estimates that consider the associated range of any location-specific conditions. Examples include the assumption that maximum reasonably foreseeable accidents would occur in the center of highly populated urban areas; evaluation of dose received by maximally exposed individuals (which addresses close proximity of the highway to hotels, casinos, retail businesses, schools, churches and residences); use of low-probability weather conditions that lead to the greatest consequences for maximum reasonably foreseeable accidents; and the assumption that no medical or other interdiction would occur to reduce concentrations of radionuclides absorbed or deposited in human tissues after a potential accident.

## **8.8.1 GENERAL**

### **8.8.1 (172)**

#### **Comment** - 11 comments summarized

Commenters said that DOE's analysis of transportation impacts is unrealistic because it is overly conservative. By considering almost every possible accident scenario during spent nuclear fuel and high-level radioactive waste transport, DOE has given credence to the virtually impossible and has, therefore, overestimated the impacts of transporting to Yucca Mountain. For example, the "maximum reasonably foreseeable accident" scenario modeled in the EIS has a likelihood of occurrence of about 1.4 in 10 million years. Considering that spent nuclear fuel and